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An Address
ON
GUNSHOT WOUNDS AND INJURIES OF THE SPINAL CORD.

Delivered before the Medical Society of London on March 20th, 1916,

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MR. PRESIDENT AND GENTLEMEN,—I must express my best thanks to you, sir, and to the secretaries of the Medical Society of London for inviting me to open this discussion upon gunshot wounds and other injuries of the spinal cord. The very large number of such cases under our observation during the past 18 months have given us a hitherto unparalleled opportunity to investigate the physiology and pathology of the human spinal cord and the symptoms resulting from its injury. Many new facts have been brought to light and much of our former knowledge thrown into a fresh perspective, and these when time has allowed of their proper working out cannot but cause a valuable advance of our understanding of the spinal cord in conditions of devolution. Necessarily in this country our observations have been made upon cases some time after receipt of the injury, but if we have been denied a scrutiny of the early symptoms we have the advantage of the excellent account of the early conditions given by Colonel Gordon Holmes in the Goulstonian lectures before the Royal College of Physicians. The subject is so large a one that it is impossible that we can in this discussion cover more than a tithe of the points which are of great interest, and therefore I shall make no attempt to deal systematically with the subject, but I shall put before you such items of my individual experience as I hope will excite interest and stimulate discussion. I think it is important in this discussion that any case of injury to the spinal cord which has an important bearing upon the subject should be brought in, whatever may have been the cause of the injury. I am going to introduce one such case myself, and I hope that those who follow me will do so if they wish.

The subjects to which I wish especially to draw attention and to ask for remarks upon are these: (1) The nature and mechanism of production of the lesions; (2) the state of the reflexes and of muscle tone in the affected region; (3) the distinction between root lesions and central lesions of the cord; (4) disturbances of sensibility; (5) prognostic indications; (6) the occurrence of rare and unusual phenomena.

THE NATURE OF THE LESIONS.

The lesions that I have met with have been caused by high-velocity bullets, shrapnel, fragments of shell casing, and by the concussion of high explosives without any external wound. A classification of the lesions, though arbitrary, is, I think, useful in considering the mode in which they are produced. Often more than one kind of lesion is present. The following is a rough classification. 1. Direct lesions. I would define as a direct lesion any lesion resulting from the passage of a missile across the spinal canal whether it touch the spinal cord or not. 2. Indirect lesions: (*a*) Those due to the in-driving of bone, &c., into the spinal canal. (*b*) Impact lesions where the missile strikes against the bony wall of the spinal canal. (*c*) Concussion lesions from the shock of high explosions. 3. Secondary lesions: perithecal and intrathecal hæmorrhage, medullary hæmorrhage and thrombosis, meningitis, œdema. These lesions are important as the cause of the deepening of symptoms often at a considerable time after the injury. 4. Remote lesions which may be found anywhere in the spinal cord and chiefly near the surface: spots of necrosis, sieve-like rarefaction, punctiform hæmorrhages, œdema, swelling of axons. These lesions are produced by the sudden raising of the intraspinal pressure caused by the passage of the missiles through the intraspinal space or by a general concussion effect. They are well marked in cases of concussion without external wound.

The mode of production of the *direct injury* is clear. The passage of a fast-moving projectile through a tissue causes not only a heat effect generated by the friction but an intense raising of the pressure in the tissues for some distance round the track, and if the bullet cross the spinal canal, which contains a fluid pressure, this momentary and severe pressure effect is transmitted to the whole of the nervous system confined within the cerebro-spinal space. The cerebro-spinal space being an elastic cavity the increase of pressure caused by the passage of the bullet will be greatest at the site of the track and will decrease in proportion to the distance from the track, but will be greater below the site of passage than above it, because the lower portion of the spinal canal is more closed and therefore less elastic. The damage to the spinal cord even when the bullet does not touch the cord nor lacerate the membranes is therefore greatest where the bullet has crossed, but it extends for a considerable distance above and below this. Lesions of the cord in places remote from the chief seat of injury are not infrequently found which are attributable to this increase of pressure, and these are always more marked in the distal part of the spinal cord. The intracranial effect of this increase of pressure is the immediate loss of consciousness which is sometimes met with, and more often in cervical injuries than in those lower down. Possibly the initial loss of consciousness may be an index that the bullet traversed the spinal canal. I think that this certainly holds good for the cervical region, for in three of my cases of cervical injury where consciousness was not lost, although the initial symptoms were severe, complete recovery occurred. It seems to me impossible that a bullet can cross the spinal canal without causing the most severe and irreparable of transverse lesions, and I argue that in all the cases where relative or complete recovery occurs the lesion has been an indirect one: either an impact lesion or due to the in-driving of bone. It is likely that a bullet does not so often cross the spinal canal, but is more often deflected by the bony wall.

Mode of production of impact lesion.—The passage of a high velocity bullet in the immediate vicinity of the spinal canal or the impact of a projectile upon the bones forming the spinal canal may cause lesions of the spinal cord sometimes very severe notwithstanding that the walls of this canal remain intact. How are these local concussion lesions produced? The anatomical relations of the spinal cord practically forbid any such displacement of the cord within the canal as could bring it

in contact with the bony wall and so bruise either directly or by contrecoup. Colonel Gordon Holmes has shown that these impact lesions show their greatest intensity immediately under the point of impact and closest to the bullet track as the case may be. I submit the following explanation of the way in which these indirect local lesions of the cord are produced. The contents of the spinal canal which intervene between its parietes and the spinal cord, and made up of the perithecal fat and vessels, the theca and the cerebro-spinal fluid, may be regarded as fluid, and the pressure within the spinal canal as a fluid pressure, contained in a vessel which has one rigid wall, the spinal canal, and one elastic wall, the compressible vessels of the cord, &c. Any lines of force either from excessive vibration, from impact, or from compression transmitted from one spot in the rigid wall will have their most intense effect upon the nearest point of the elastic wall—i.e., the nearest spot in the spinal cord and little elsewhere, the force becoming rapidly spent upon the elastic wall as it radiates. The damage to the spinal cord produced in this way by indirect injury may be from the most severe with symptoms of a total transverse lesion with no recovery, to the slightest with complete recovery. The two following cases are examples of the latter:—

CASE 1.—Patient was hit in left posterior triangle of neck with a rifle bullet. He at once fell paralysed in left arm and leg, but was never unconscious. He came under my care a fortnight after the injury. The skiagram showed the rifle bullet apparently lodged vertically in the odontoid process of the axis. Movements of head and neck were perfectly free and there was no pain. The physical signs were those of strictly unilateral lesion of the left side of the cord at the level of the fifth cervical segment together with a lesion of left fifth and sixth cervical roots. The left arm and leg were spastic, the muscles supplied by the fifth and sixth cervical roots excepted. The left abdominal reflex was absent and the left plantar reflex extensor. The sensory loss was of the usual Brown-Séquard type. It was obvious from his story that he was recovering rapidly when he came under observation both as regards the root lesion and as regards the spinal cord lesion. He made an uninterrupted recovery in the course of two months. In this case the root lesion was probably caused by bruising of the cord formed by the fifth and sixth cervical roots in the posterior triangle and the spinal lesion by the impact of the bullet against the left side of the fourth cervical arch which received a serious jar in that it deflected the bullet from a horizontal to a vertical course. This case shows that the injury to the cord from impact against the bone is directly contiguous to the site of impact.

CASE 2.—Patient was shot by a rifle bullet which traversed the spinal column transversely at the level of the eighth dorsal segment. He was immediately paralysed and completely anæsthetic below the umbilicus. Within 24 hours he began to pass urine naturally, and when he came under my care a week later he had no sphincter trouble, the sensory loss was relative only, and there was some feeble volitional movement of all the muscles of both legs. He has made good progress, and now at the end of three months he can walk well and can run, but somewhat stiffly. The extensor plantar reflexes are still present. It seems to me impossible that the bullet in this case can have entered the spinal canal on account of the small damage to the spinal cord and the completeness of recovery, and I consider that this case was one of an impact lesion from the passage of a high-velocity bullet in the immediate vicinity of the spinal canal.

Concussion lesions.—Severe indirect injuries of the spinal cord may occur from the bursting of high-explosive shells when the back is turned towards the force of explosion without any external wound occurring, without any detectable lesion of the bones, and even without bruising of the soft tissues. I have seen three such cases, of which the following are examples:—

CASE 3.—Patient, crawling forward to the attack on his hands and knees, was for the moment resting prone, with his body stretched upon the ground, when a high-explosive shell burst over him. His consciousness was not affected, and he was able to give me exact details of what happened. At the moment of the bursting of the shell he experienced a sharp tingling sensation in the legs and immediately lost all knowledge of the lower part of his body and legs. He felt no blow upon the back and no pain. He was quite sure that the force of the explosion did not shift his trunk. He told me that the absence of any bruising upon his back was remarked upon by the doctors who examined him in the first place and for the two weeks following his injury. His initial condition was one of total transverse lesion of the cord at the level of the ninth dorsal segment. When I saw him some three months later there had been practically no improvement in his condition. The skiagram showed no abnormality in the bones.

CASE 4.—The history was identical with that of the foregoing case. The patient was, however, rendered unconscious and there was very marked bruising of the back, but the skiagram showed no signs of injury to the spinal column. The clinical picture was that of total transverse lesion of the spinal cord, and there was practically no recovery.

I was not able to follow any of these cases to their termination. In such cases as these, where severe spinal lesions have been produced by the force of high explosion at a distance without any external wound, it is possible to conceive that there has been such distortion of the spinal column as might produce a subluxation of the vertebræ which became immediately reduced, and that during this subluxation the bony rings which make up the spinal canal crossed to such an extent as to produce a severe local transverse lesion of the cord. That such a subluxation is possible has been proved experimentally upon the cadaver, and that it can severely pinch the spinal cord has also been proved, and there is much evidence in the records that such a subluxation, immediately reduced, is one of the lesions that may occur in cases of broken back. I have examined one such case in which a total transverse lesion resulted from a fall from a haystack. The spinal cord was almost severed within the membranes, and although I macerated the bones I could find no sign of fracture. I do not, however, see that there is any evidence in favour of the occurrence of such a subluxation in the cases under consideration, and the histories of the above cases and of several others that I have been told of are against it. We must therefore regard these lesions as impact lesions. It seems remarkable that the impact of the force of the explosion upon the dorsal surface of the body could be sufficient to produce local spinal concussion and a sharply local lesion of the cord without any evidence of severe bruising of the skin and soft tissues. In my three cases and in several others that I have heard of the lesion was in the lower dorsal region. It is a point of great interest as to whether such severe local lesions from explosion occur in other regions, and I should like to ask those present, and especially Dr. Wilson, who is going to tell us about a case that recovered, and Major Mott, who is going to show us the lesions actually produced by this form of injury, in what region of the spinal cord the chief lesion has been found in their cases.

Root lesions.—Sometimes the lesions produced by projectiles affect the spinal roots after they have left the thecal space to a much greater extent than they affect the spinal cord and thecal contents. This seems to me to be the case when there has been much fracture and crushing of the bone, and especially in the region of the transverse processes. There is usually much swelling and œdema in the injured region of the spine. Such root lesions are not entirely due to direct injury, for they may be widely spread when the injury is comparatively local. They may result from subperiosteal hæmorrhages and periosteal swelling, which strangle the roots in the intervertebral foramina, or from pachymeningeal hæmorrhage. Of this last condition—pachymeningeal hæmorrhage—I have had an interesting example.

CASE 5.—Patient was hit by a piece of shrapnel in right lumbar region. The projectile crossed the lumbar spines and came to rest at the left side of the third lumbar vertebral body. There was immediate paralysis of the legs and sphincters with total sensory loss. He came under my care 14 days after the injury. There was total flaccid palsy in both legs in the sciatic supply, with much wasting and loss of faradic excitability. There was feeble power in the quadriceps and adductor groups on both sides. The knee-jerks were absent. There was complete sensory loss over L. 4, 5, S. 1, 2, 3, 4, 5 on both sides. There was complete loss of sphincter control with severe cystitis. There was considerable swelling in the central region of the lower back, and the spines of the third and fourth lumbar vertebræ could be felt to be loose. A laminectomy was performed but was not followed by any marked improvement, though some sensibility was gained in the fourth lumbar areas of both sides and in the fifth on the right side, and after some months the patient succumbed to renal infection.

My diagnosis in this case was that of a lesion of the cauda equina. The necropsy showed that the cauda equina within the theca had not been injured. The anterior roots of the cauda were normal from their points of origin from the cord to their exits from the theca, while the posterior roots from the fourth lumbar downwards were extremely atrophied and grey. The lateral walls of the theca were much thickened, and along the line of the root exits were as much as one quarter of an inch thick. This thickened thecal wall presented in section a sandwich-like appearance, a white tough outer and inner layer enclosing a reddish-yellow softer layer. This condition appeared to have strangled all the sacral and lower lumbar roots, but it did not cease there. It extended along the line of the roots on both sides as high as the upper dorsal region, gradually lessening in intensity, and towards its upper limits the inner surface of the theca was definitely hæmatoidin-stained. The anterior and posterior walls of the theca were only involved in the region of the lumbar enlargement and the cauda equina, and then to a much slighter extent than were the lateral walls along the line of the root exits. It seems to me likely that this condition of pachymeningitis arose from hæmorrhage into the extrathecal roots where these are enclosed in the tube-like prolongations of the theca, and that this hæmorrhage had spread like a dissecting aneurysm between the layers of the spinal theca and had strangled the roots.

Intrathecal hæmorrhage.—Among the many lesions of the spinal cord met with resulting from bullet wounds there are two upon which I should especially like to comment. The first of these lesions is intrathecal hæmorrhage. Blood effused into a free thecal space finds its way with the stream of cerebro-spinal fluid into the lower part of the thecal space around the cauda equina and lumbo-sacral enlargement, and if massive in quantity may distend that space, causing pressure upon the roots and epiconus, and clotting there may cause such matting and cicatrisation as may completely destroy by pressure and evascularisation the cauda equina, and if it extend high enough the lumbar enlargement as well. Smaller effusions by clotting and the formation of condensing adhesions may cause local signs of nerve-root involvement. In a severe condition of this kind where there has been extensive intrathecal hæmorrhage—due, let us say, to a lesion of the mid-dorsal region—the physical signs in the lower extremities may resemble exactly those due to a complete lesion of the cauda equina or of the lumbo-sacral enlargement. In the less severe condition the local deposit and subsequent cicatrisation of blood-clot round individual roots of the cauda may cause physical signs difficult of explanation unless the possibility of the occurrence of intrathecal hæmorrhage and its results are kept in mind. The following is a case in point:—

CASE 6.—Patient was wounded by a bullet traversing spinal canal at level of sixth dorsal segment. Seen two months after the injury, he presented total paralysis with complete sensory loss below the sixth dorsal area, with complete absence of all reflex action and severe wasting of the muscles, none of which responded to faradism. The necropsy showed the caudal part of the theca filled by a mass almost as hard as cartilage and somewhat like cartilage in appearance. It presented no appearance of hæmatoidin staining. Microscopic examination showed it to be an organising coagulum in which the remains of the degenerate nerve roots could be seen embedded. The lumbo-sacral enlargement itself was not embedded in this hard substance, but it showed severe degeneration throughout, evidently from the strangling of the root vessels. Higher up and extending to the sixth dorsal segment the cord was surrounded by a ring of old blood-clot still coloured and firmly adherent both to theca and to cord. The lesion of the cord at the sixth dorsal level was by no means a complete transverse lesion.

It is easy to conceive of cases of thecal hæmorrhage where the matting round the cauda equina is less severe and gives rise to partial lesions of the cauda only, and therefore in cases where the bullet lesion of the spinal cord is above the lumbar enlargement and unusual conditions of reflexes, spasm and contracture are present in the legs it is well to consider whether a condition of thecal hæmorrhage and matting of the cauda equina may not exist. Local wasting of muscles and local loss of faradic excitability may be indications that such a condition exists. The early diagnosis of this condition in such a stage as to allow of the removal of the blood by lumbar puncture and washing out with citrate solution is apparently impossible, for the initial aspect of nearly all the spinal lesions resulting from bullets is that of total transverse lesion, and therefore the development and deepening of the signs of involvement of the cauda equina cannot be detected. In one civilian case, however, I was able to observe the development of such symptoms:—

CASE 7.—Patient had a fracture-dislocation of seventh dorsal vertebra resulting from a fall. He was received into hospital within ten minutes of the accident and was found to have complete paralysis of both legs. Sensation was not deeply affected. The knee-jerks were present and there was an extensor plantar on both sides. Two hours later, when again examined, there was complete flaccid palsy with complete loss of all reflexes and complete loss of sensibility. Unfortunately this was before the days of lumbar puncture. Immediate operation was advised, but the surgeon in whose charge the patient was preferred to wait until the shock had passed off, and when he operated many days later found the theca and cauda equina densely filled with adherent and irremovable clot.

The second remarkable condition that I wish especially to refer to is a condition of *total necrosis of the distal segment* of the spinal cord which was found in one of my patients.

CASE 8.—The lesion was a total transverse lesion at the level of the third dorsal segment. There was total paralysis, total sensory loss and total reflex loss below the lesion, and all faradic excitability was lost. This patient survived for three months. The whole of the distal segment of the cord was completely necrotic and much shrunken, and resembled a strip of greenish yellow wet wash-leather. There was no sign of hæmorrhage, extrathecal or intrathecal, and no sign of any septic process.

I have seen one civilian case in which a condition exactly comparable to the above occurred from fracture-dislocation at the level of the sixth cervical segment in a child. The injury occurred from traction upon the neck during delivery, and the patient survived ten weeks. This case was recorded by the late Dr. Charles Beevor, the pathological report being by Dr. F. E. Batten. Such lesions are very difficult to explain, but the most plausible theory that I can put forward is that a spreading thrombosis throughout the blood-vessels of the distal segment occurs. When one considers that both the anterior and posterior spinal arteries were severed at the site of the injury, and that the injury in both these cases was high in the cord cutting off most of the splanchnic supply and therefore entailing a low blood pressure, and that the tearing of the theca must have deranged the relations of the cerebro-spinal fluid, the possibility of the occurrence of such a spreading thrombosis is conceivable.

REFLEX ACTION.

Time does not permit me to make more than the briefest reference to the condition of the reflexes and of the muscle tone, to contractures and positions of the limbs and to the electrical excitability of the muscles which obtain in the cases under consideration, though the study of these phenomena is one of the most important. It is usually held that the initial condition of reflex action after the occurrence of severe lesion of the spinal cord is that there is complete loss of both jerks and superficial reflexes, or that if the loss is not complete the only sign of reflex action left is a feeble flexor response occurring in the toes, only obtainable from plantar stimulation, and that the early presence of the extensor response or its early return is indicative that the lesion is not complete and is of good prognostic import. I have seen one case which negatives this view. The patient fell from a considerable height, striking his back against the corner of a wall, crushing in four pairs of the upper dorsal laminæ. An operation was immediately performed and showed that some three segments of the spinal cord had been utterly destroyed, the upper and lower ends being found separated by some inches. I examined the patient within a few hours of the injury and repeatedly until his death on the fourth day after the accident, and during this time an extensor response was always present. Colonel Gordon Holmes has laid it down very clearly that the condition of the plantar reflexes in all the cases which he has examined shortly after the injury has been either that they are completely absent or that there is a reduced flexion response, but he is careful to add that his examinations have taken place not earlier than the second day after the injury.

I submit that there may be four consecutive stages in the condition of the plantar reflexes following a transverse lesion of the cord: 1. An initial extensor response. 2. Either a complete absence of any reflex, which may be the result of shock or of isolation alteration, or a reduced flexion reflex which is the result of isolation alteration which may come on rapidly. 3. The extensor response which when persistent is indicative of a less severe lesion or alternatively of more recovery than the reduced flexion reflex. 4. The normal flexion reflex which returns when recovery is complete. I have repeatedly observed the successive changes from no reflex to the reduced flexion response, and from this to the extensor response in cases where some improvement is occurring; and conversely I have seen the extensor response change to the reduced flexion response and the subsequent loss of all reflex action in severe cases which were not improving, and where the only attributable cause for such a change seemed to be the long-standing isolation of the distal segment of the cord. The condition of the plantar reflex is therefore an index of the severity of the damage to the spinal cord and an important early indication as to whether recovery is occurring or not.

Colonel Gordon Holmes has made the very interesting suggestion that the simple flexion of the toes which can be obtained only by stimulating the sole in cases of severe transverse lesions of the cord, and which I have called the "reduced flexor response," is a unisegmental reflex involving the first sacral segment only, and that when the physiological vitality of the lumbar enlargement is much reduced by isolation from the higher nervous system the only reflex response that can be obtained is a unisegmental reflex. My observations incline me to support strongly Colonel Gordon Holmes's theory. I have repeatedly noticed, in a case where some recovery is occurring and where the reduced flexor response is changing to the extensor response, that a minimal stimulus will produce flexion of the toes and a more severe stimulus will result in extension of the toes, or that there is first flexion and subsequent extension of the toes, but never the reverse. That is to say, the threshold for the unisegmental reflex is lower as one would expect.

Another most important point that the experience of this war has brought out is that the influence of the higher nervous system upon the reflex action and muscle tone of the spinal cord is strictly homolateral so far as the cord is concerned. That is to say, that a total unilateral lesion of the cord produces complete flaccidity with loss of knee- and ankle-jerk and reduction of superficial reflex upon the side of the lesion. This will explain those cases in which we meet with an extensor response upon one side and a reduced flexor response upon the other, in that one has a transverse lesion more complete upon one side than upon the other.

Contracture is a phenomenon which is intimately associated with the condition of reflex action. In these paraplegic cases with which we are dealing there are three conditions of contracture of the feet: 1. The dropped foot with retracted toes. This is the ordinary pes cavus of spastic states—the crystallisation of the extensor response. 2. The retracted foot with retracted toes. The calcaneus position is often extreme. The ankle-jerk is always lost and the anterior tibial-jerk marked. An extensor plantar reflex is always present. 3. The dropped foot with dropped toes, the position being similar to that of peripheral neuritis. The plantar reflex is either absent or there is a reduced flexor response.

I have observed in several cases the dropped foot with dropped toes gradually change into the spastic pes cavus with a change of the plantar reflex from the reduced flexor to the extensor type in cases where some improvement has taken place, and therefore I consider that the dropped foot with dropped toes indicates a more complete transverse lesion and that it is produced by a relatively greater muscular tone in the flexors of the toes than elsewhere, and that it is associated with the reduced flexor response just as the pes cavus is associated with the extensor response in less severe transverse lesions.

The calcaneus position with retracted toes is a very remarkable phenomenon. It has been persistent in those cases in which I have met with it, and has been always associated with loss of knee- and ankle-jerk and increase of anterior tibial and hamstring jerks. The extensor response and active withdrawal reflex have always been present. I have not examined such a case pathologically, but in one such case which Colonel Armour explored for me the chief lesion seemed to be a division of the ventral half of the dorsal cord.

I have carefully examined the electrical excitability of the calf muscles and of the anterior tibial muscles in extreme cases of the equinus and calcaneus positions, and have found that there is no difference in the faradic excitability of these muscle groups, thus proving that these positions of feet and toes are not due to any secondary lesions of the cauda equina or lumbo-sacral enlargement.

I have met with one curious reflex phenomenon in the leg in a way comparable to the curious reflex which Colonel Gordon Holmes has observed in the arm in a case of cervical lesion. My case was one of a mid-dorsal lesion, total upon the right side of the cord and severe upon the left. The right leg was completely flaccid and the only sign of reflex action present was that on stimulating the sole, after a latent period of four seconds or more, a feeble flexion and adduction of the thigh occurred. This reflex was easily tired out, and was only obtainable on gentle stimulation of the sole.

The physical signs obtaining in the lower limbs in transverse lesions of the cord seem to be the same whatever the level of the lesion above the lumbar enlargement.

There is one question which I would like to put to each of the speakers who follow me: What is the ultimate condition of the paralysed region in cases of total transverse lesion of the cord which are long survived? My own suggestion is that the slow process of physiological deterioration which we call "isolation dystrophy" may reach such a point that no signs of activity of the lumbar enlargement remain.

To the usual types of paraplegia resulting from lesions of the spinal cord and representing different degrees of isolation of the distal segment—namely, "paralysis in extension" and "paralysis in flexion"—I think that we might speak of a third type—that of complete flaccid paralysis. For it is from this stage of complete flaccid paralysis that the other types successively develop when improvement is occurring, and to this type they successively return when there is an increasing lesion or from long-standing isolation of the distal segment. There is, of course, no sharp separation between these types; they merge into one another gradually.

Distinction between Root Lesions and Central Lesions.

The diagnosis between lesions of the roots and lesions of the central grey matter is sometimes impossible, as, for example, when a lesion of either of these structures is complete. It is sometimes quite simple when a single root or so is damaged and there is characteristic sensory and motor loss in the area of distribution of the damaged root. In many cases, however, the diagnosis is far from a simple matter, and in some of these both lesions may exist together. The following points may be useful in the diagnosis: 1. In the cervical region extensive root lesions are only met with when there is severe injury of the bones, especially of the transverse processes and spines, and these are recognisable by deformity, swelling and œdema, and radiography in the absence of these signs, an atrophic palsy of the arms is probably the result of a central lesion, if it is extensive. 2. In central lesions the upper limit of the sensory loss is a line more or less transverse to the axis of the limb—that is to say, the sensory loss is of the "glove" or "stocking" pattern, in contrast to the more or less longitudinal limitation which obtains in root lesions. 3. In the cervical region a relative escape of the long columns or early signs of recovery in these with severe paralysis of the upper limbs is in favour of a root lesion, and may suggest the correct diagnosis at an early stage. 4. In the lumbo-sacral region the most certain indication is the level of the wound of the spine if this can be determined with certainty.

Disturbances of Sensibility.

The chief points of interest in this connexion are the paths taken by the sensory fibres in their spinal course, the sensory loss resulting from unilateral lesions, and the explanation of remote pains. The usually accepted paths of sensation in the spinal cord are as follows: 1. The path for touch is a double one, in the homolateral dorsal column and in the crossed lateral column. 2. Pain, heat, and cold are conveyed by separate fibres in the crossed ventrolateral column. 3. Sense of position, of passive movement, of vibration and recognition of form and of the compass points are conveyed in the homolateral dorsal column. The crossing of the sensory fibres in the cord occupies one to two segments in the lower dorsal region, but increasingly more segments as the cord is ascended, so that in the cervical region some five segments are occupied by the crossing. There is no crossing below the last dorsal segment. The path for painful and thermal stimuli crosses more rapidly than does touch. Consequently a unilateral lesion of the cord does not produce a Brown-Séquard syndrome when the lesion is at the level of the first lumbar segment or below this.

The symptoms of the unilateral lesion are that there is motor paralysis, loss of sense of position and of passive movement and of appreciation of vibration, form, and compasses upon the same side below the lesion, and loss of pain, heat, and cold upon the opposite side. The bilateral loss in the region of the lesion from the involvement of both right and left crossing fibres is narrower for pain and temperature than for touch. This bilateral loss is much narrower in the dorsal than in the cervical regions on account of the increasing obliquity of the crossing fibres. My observations have been in accord with the above scheme with one exception. In the majority of my cases of unilateral lesion of the cord the vibration sense has been lost or most affected upon the opposite side, and this has obtained both in severe and in slight lesions. I must admit that I have no pathological evidence in such a case.

Remote pains are very obstinate in some cases. Their mode of origin is obscure. Obviously, they are only met with in those cases where the sensory conducting tracts are relatively intact. The usual symptom-complex that I have met with is that there is a transverse lesion in the dorsal region with good recovery of sensibility and some recovery of power in the legs. There is considerable rigidity of the legs and phasic flexor spasms are invariably present, and there is more sphincter trouble present than the condition of recovery of motion and sensation would lead one to expect. There are three kinds of pain: dull persistent pain, sharp lancinating pains, and cramp. They are said always to disappear if the patient recovers. My experience is that they certainly persist if he does not recover.

There are three possible explanations of these pains: 1. That they may be caused by irritation of the sensory tracts in the region of the lesion. 2. That they may be caused by meningeal adhesions and matting of the cauda equina by the organisation of intrathecal extravasation of blood. 3. That they may be the result of the muscular rigidity and flexor spasms. Colonel Gordon Holmes is in support of the first of these causes, since in some cases the pain is distributed from the lesion downwards to the feet. The similarity of these pains to those which obtain in conditions of chronic spinal meningitis suggests that meningeal adhesions and

irritation of the roots are present in some of the cases. The fact that they disappear as recovery advances and persist if there is no further recovery points to the condition of local muscular spasm as being the chief cause in some of the cases.

RARE SYMPTOMS.

Among the rare symptoms which have been described, hypothermia and anuria in cases of cervical lesion and vomiting in mid-dorsal lesions have not come under my observation. These are early symptoms and are either rapidly fatal or they do not persist, so that we do not see them in the later stages. Pyrexia and tachycardia in cervical cases have both come under my notice, as has also polyuria in dorsal cases. Herpes zoster from injury to the root ganglia is necessarily an early symptom and has not occurred in any of my cases. Neither have I observed anything approaching the remarkable rhythmic movements which have occurred early, in so large a proportion of Colonel Holmes's cases of lesions in the upper lumbar region. I have had one remarkable case of cervical shivering.

CASE 9.—In this patient, who came under my observation within a week of his injury, the cervical laminæ were smashed in upon the cervical enlargement and there was total paralysis of all the limbs, the arms being flaccid evidently from a central lesion, but the legs were extended and spastic. Laminectomy was performed but no improvement took place. The legs slowly became flaccid. Cystitis developed and death ensued in ten weeks. The shivering involved all the muscles above the lesion; it was not apparent during the first few weeks, but it developed insidiously and became intense as the patient went down hill. For a time it was almost continuous and was a most distressing symptom. It was accompanied by the most profuse sweating of the head and neck and by marked signs of splanchnic palsy, abdominal distension, and low blood pressure.

Cervical shivering has been met with in lesions of the lower cervical and the upper three dorsal segments only and the lesions in all the cases have been severe.

PROGNOSTIC INDICATIONS.

In nearly all the cases the initial clinical picture is that of a total lesion of the cord, and in the early stages for prognostic indications as to how much of the transverse lesion is anatomical and how much physiological we must look to the condition of the reflexes. The early reappearance of the plantar reflex if lost at first and the change from the flexor to the extensor type soon after the seventh day, or the presence of an extensor response earlier than this, are certain indications that the lesion is partial and that some recovery will occur. Persistent loss of the plantar reflex and long-lasting flexor response are indications that the lesion is severe and that useful recovery is highly improbable. Early return of the knee-jerk and of the ankle-jerk is of good prognostic import. Even in the less severe cases the knee- and ankle-jerks do not return before the fourth day, and their reappearance before this date gives hope that complete recovery may occur. Colonel Gordon Holmes is of opinion that the presence of an extensor response is a certain indication that the lesion is incomplete. These remarks apply to each leg individually. The condition of the reflexes on one side has no bearing as to the recovery of the opposite limb. The further prognostic indications are simple. They depend upon the date of return and the rapidity of return of sphincter control, of sensibility, and of motor power. Early return of sphincter control is one of the best of signs. In two cases where recovery has been complete, and in two other cases where recovery has been nearly complete, some sphincter control returned within a week of the injury.

THE DISSOCIATION OF CUTANEOUS SENSATIONS IN INJURIES TO PERIPHERAL NERVES.

BY DONALD E. CORE, M.D. MANCH., M.R.C.P. LOND.,

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DURING the past eighteen months a series of observations have been carried out on the patients of the 2nd Western General Hospital for the purpose of comparing the relationship to each other of the areas of anæsthesia to different forms of cutaneous stimuli resulting from injuries to the peripheral nerves. A preliminary communication will be of interest. It has been found that the comparison of the area of sensory loss to the touch of a small brush with that to the prick of a sharp steel needle gives valuable information as regards the kind of injury from which the affected nerve is suffering.

In testing cutaneous sensation with different forms of stimuli it is not common to find an exact correspondence of the respective areas of sensory loss, and this is especially true for the types of sensation represented by light brushing of the skin and gentle pricking. The kind of brush used throughout in these observations has been that sold by Messrs. Winsor and Newton under the name of "crow sable." This method is rough when compared with the use of von Frey's hair æsthesiometer, yet such a brush, when suitably mounted in a metal handle, is capable of producing a very delicate form of skin stimulus. The other form, gentle pricking of the skin with a sharp steel needle, was employed in such a way that the pressure used was just enough to evoke a feeling of pain when a corresponding area of skin on the opposite limb was touched in the same way.

Nerve injuries may be complete or incomplete and the latter group comprises a number of injuries, varying from partial severing of the nerve with more or less implication of the remaining fibres in the resulting fibrous tissue, to pure compression without any anatomical division. Although it is easy in most cases to classify a nerve injury as "severe" or "slight," it is not easy in my experience to make quite sure that the lesion is or is not complete in cases of the first of these groups, from the extent and intensity of the symptoms alone. Often enough, motor and sensory loss that appeared from their severity to indicate a completely divided nerve have been shown later to have been due to an incomplete division. The motor symptoms and the sensory loss are not in themselves enough to settle the question, whereas a comparison of the areas of anæsthesia to the two forms of stimuli mentioned above, in the majority of cases, is.

The study of complete nerve injuries is best carried out in post-operative cases, in which the completeness of the division is certain. For access to this class of case I am indebted to Lieutenant-Colonel J. W. Smith, Lieutenant-Colonel W. Thorburn, Major J. Howson Ray, and Captain E. D. Telford.

Complete Division of a Nerve.

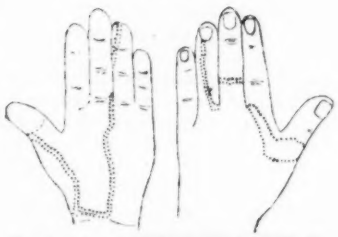
When a nerve trunk has been completely divided the following condition is found in the field of its distribution: a centrally situated area of profound sensory loss and a peripheral zone of loss to the more delicate forms of stimuli. If this peripheral zone be examined with the brush and needle in the

manner described above it will be found that the loss of sensation to brush is more extensive than that to the needle. Figs. 1 and 2 are examples of such cases (Fig. 1) being from a young officer whose median nerve had been resected by Lieutenant-Colonel Thorburn, and Fig. 2 from a case of ulnar nerve resection performed by Lieutenant-Colonel Smith.

Compression of a Nerve.

In cases of pure compression without any anatomical division of the nerve fibres the reverse holds, and there is a dissociation of sensation in which the loss to needle-point is greater than that to brush. In the majority of cases this is very definite indeed, the patient under examination saying that in the intermediate area he cannot feel the pain of the prick, although he can feel the touch of the needle. The following is taken from a very instructive case of this kind. The patient was a private who complained of loss of sensation and dryness of the skin over the inner side of the forearm on the left side with weakness of the small muscles of the left hand. There was no wound to account for his symptoms and a radiograph showed the presence of a cervical rib on the *right* side and something that was described as an abnormal ossification about the first rib on the left side, the side of the anæsthesia. The dissociation of sensation in this anæsthetic area was: Loss to needle-point more extensive than that to brush. At the operation, which was performed by Captain Telford, there was found a normal first rib on the left side, exerting compression on the branch of the first dorsal root passing to the brachial plexus; this contribution from the first dorsal was abnormally big. Relief of the compression was followed the day after by sweating in the anæsthetic area, a condition that had been absent for months. In other words, this dissociation of sensation, loss to needle-point more extensive than that to brush, was due to compression of the nerve fibres in this case, and from other patients that I have seen I have come to the conclusion that this form of dissociation is characteristic of compression and is against division of the nerve, certainly against complete division.

FIG. 1.



The dots (outer line) represent the limits of anæsthesia to brush touch; the crosses the limits of that to needle-prick.

FIG. 2.

The dots and crosses have the same significance as in Fig. 1.

FIG. 3.

The dots and crosses have the same significance as in the preceding figures.

In the two types of cases described above complete division and pure compression, the marks made in mapping out the two areas of sensory loss will be found to remain equidistant from each other, but a number of cases are met with in which this equidistance is not maintained. Two such variations are commonly met with.

1. The types of dissociation are mixed; for part of the area of anæsthesia there is the dissociation of complete division, and for the remainder that of compression. This leads to a "lateral displacement" of the two areas of sensory loss. In some of these cases this relationship is due to the implication of two nerves in the wound, innervating adjacent areas of skin; one is divided and one compressed, and the loss to brush falls without and within that to needle-point respectively. Fig. 3 is a case of this description. The wound was a severe one on the inner side of the left arm just above the elbow; the humerus had been injured and the median and radial nerves involved. The median area showed the dissociation of complete division, the small muscles of the thenar eminence were paralysed and wasted, and the reaction of degeneration was present. The radial nerve area showed a dissociation of compression; the pressure of a blunted object was appreciated.

In other cases of this type the anæsthesia indicates the injury of one nerve only, and yet the dissociation is of this mixed type. Further investigation is required for these cases, but I am strongly of the opinion that they are due to a partial division of the nerve with compression of the remaining undivided fibres. This view is strengthened after reading the paper by Captain Wilfred Harris in THE LANCET of Nov. 13th, 1915, p. 1073, where the writer describes a case in which he found reason to believe that in the median nerve there was a separation of fibres destined to innervate the dorsum of the fingers from those running to the palmar aspect of the hand; and that this separation took place early in the nerve trunk. If this separation exists as a rule in nerve trunks, then it is quite probable that an incomplete division of the nerve would lead to the form of dissociation under consideration.

2. In this type the limits of the areas of sensory loss to brush and needle-point respectively approach and recede, so that they show an undulating or wavy relationship to each other. For the most part the dissociation is that of compression, the needle-point loss falling without the brush loss; in some cases, however, the limiting edges of the two sensory losses frequently cross each other. In yet another variety of this type the edges show a tendency to coincide for a considerable part of their course.

It is not quite easy to assign the true cause to these forms of dissociation, other than to say that they are not due to complete division nor to pure compression. They are found most often, I think, in cases that are "hanging fire" for some cause or other, and the outlook in such cases is not good.

Summarising these results, then, I would lay emphasis on the statement that it is possible in the great majority of cases to diagnose the condition of the affected nerve from the dissociation of cutaneous sensations met with.

In complete division the loss to brush is more extensive than that to needle-point (cutaneous pain).

In pure compression the loss to brush is less extensive than that to needle-point.

A dissociation characteristic of complete division associated with one significant of compression is occasionally met with. This leads to a "lateral displacement" of the two areas of sensory loss; it is met with when more than one nerve is injured, and when the nerves involved supply contiguous areas of the skin. It indicates the complete division of one of these and the compression of the other. When such a dissociation is met with in the territory of one nerve it is possible that it is the result of partial division of the nerve with compression of the undivided fibres.

An undulating form of dissociation, where the limiting edges of the two areas of sensory loss approach and recede or constantly cross each other, is met with in cases that are at a standstill. No satisfactory explanation has as yet been arrived at for this type.

In certain areas there is no dissociation; the two areas of sensory loss coincide. I have not found this common except in lesions of the external popliteal nerve.

In the course of the above investigation several cases were seen that differed from the majority of cases of nerve injury in that pain was a prominent symptom. In many of the cases dealt with a certain amount of discomfort was present, but in those under discussion now the pain has certain characteristics that put them into a class by themselves. Such pain is intense; it is associated with extreme tenderness over the affected parts: it is badly localised. The patient does not give any precise description of its whereabouts, but can only say vaguely that it is in the palm of the hand or the sole of the foot, as the case may be. The pain is of a burning, tingling character and reacts variably to hot and cold applications. My experience of these cases is that cold is preferred in the majority rather than heat. The condition is associated with incomplete injuries of the nerve affected, and the nerves most commonly affected in this way are the median and the great sciatic.

If the history of a case of this kind is asked for, it will generally be found that the pain and tenderness did not appear for some little time after the wound, and the sequence of symptoms during the course of the case is instructive. The sensory loss increases in extent and intensity during the period of the pain; when the pain subsides, as it does in the course of time, what at the time of the injury was a comparatively slight sensory loss, at the time of subsidence is that of a practically complete nerve division, the type of dissociation most frequently met with being the wavy variety. Trophic changes are usually prominent in cases of this kind.

If a part of the nerve affected be excised at the site of the injury, there is found a diffuse intraneural fibrosis. This fibrosis is distinct from the perineural fibrosis or implication of the trunk in scar tissue, and is to be looked upon as the cause of the pain and tenderness. It is a progressive condition, and ultimately leads to the loss of conductivity of the nerve affected, in the absence of suitable treatment. Intraneural fibrosis of this kind does not occur in cases of primary complete division; it is liable to occur in nerves that have been partially divided and that are associated for the greater part of their length with soft tissues—nerves that are associated with bones will be compressed too rapidly in the majority of cases for the intraneural fibrosis to develop. The median and sciatic nerves are thus specially prone to the condition.

The dissociation of certain of the cutaneous sensations as a result of injuries to nerves, whether due to complete division or to compression, opens up many points of interest, notably the cause of the different degrees of vulnerability of nerve fibres and the bearing of this on the dissociations that are to be found in conditions other than peripheral nerve injuries. These points, however, are out of place in a communication of this kind; they will be dealt with in a future paper.

In these investigations I have been associated throughout with Dr. J. S. B. Stopford, of the Anatomy Department of the University of Manchester. The existence of the dissociations described above was recognised early, and we decided to devote our attention to their significance. The division of work was such that Dr. Stopford saw for the most part the post-operative cases and I saw those that had not been operated upon; on comparing our findings Dr. Stopford suggested that this might account for the two forms of dissociation described above. Every case that we have examined since then has strengthed our conviction that this is the true explanation of these two forms of dissociation. The bearing of our observations on the subject of treatment is being dealt with by Dr. Stopford in a paper which I am informed is about to be published.[1]

GUNSHOT INJURIES OF THE PERIPHERAL NERVES: THE SYNDROME OF COMPRESSION.

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THE numerous examples of injury to the peripheral nerves in our military hospitals probably provide more problems than any other class of case, and the controversies about the advisability of surgical interference are still maintained in this and other countries. Contact with these cases makes it apparent that critical observations and further investigations are necessary in order to obtain the highest percentage of good functional results with the shortest periods of inactivity.

At the outset most cases exhibit a complete interruption of conduction in the affected nerve below the site of the injury, but even at this time the anatomical diagnosis may be obscured either by superadded functional manifestations (especially in lesions of the clavicular region) or damage to one or more other nerves. The latter complication produces greater difficulty later, as, owing to the frequent variation in severity of the injury inflicted upon the individual nerves, it is not unusual to get early partial recovery in one which causes an irregular anatomical distribution of the motor and sensory symptoms.

Owing to the profound initial symptoms obscuring the extent and character of the injury, and the risk of sepsis, it is universally considered advisable to withhold operative measures until the wounds are soundly healed and the nerve has had a reasonable opportunity of demonstrating signs of recovery. There is considerable divergence of opinion as to the length of this period because it is impossible to enunciate any hard-and-fast rule. Each case ought to be decided on the results of careful regular clinical examinations, and it is hoped that some of

[1] The paper referred to commences on this page.

the points raised in this paper may be helpful at this stage. During the important period of observation the paralysed muscles must be fully and constantly relaxed by splints, and daily massage and passive movements practised in order to encourage recovery and prevent contractures.

From the observation (on behalf of the Medical Research Committee) of upwards of 90 cases in the hospitals of the 2nd Western Command, it is suggested that the following factors must be considered as influencing the prognosis and consequently the treatment.

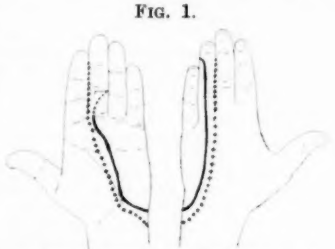
1. The extent, character, and distance from the periphery of the injury. Extensive damage to the surrounding structures increases the formation of scar tissue, which by its contraction is liable to strangle the nerve. Irregular missiles, as shell casing, tend to lacerate the nerves themselves more than bullets. A nerve which is in a state of tension at the time of the reception of the injury is more likely to be torn than one which is lying slack, and consequently the position of the limb influences slightly the predisposition to laceration. It is well known that peripheral injuries of nerves have a better prognosis than more central ones in the region of the nerve roots.

2. Such complications as fracture and sepsis obviously add to the gravity of the prognosis. They both magnify the risk of secondary implication of the nerve in either callus or fibrous tissue.

3. The treatment before the case comes under observation is also important, as failure to relax the paralysed muscles during the early stages appears to be a very potent cause of delay in recovery.

4. The amount of cicatricial tissue formed around the nerve. Excessive fibrosis and the frequency of incomplete division constitute, to a considerable extent, the differences between war injuries of nerves and those encountered in civil practice. The effect of fibrous constriction during healing is most significant in the study of these cases, and its influence upon prognosis and treatment cannot easily be over-emphasised.

FIG. 1.



Analgesia (crosses) and anæsthesia (line) in Case 1 before operation.

FIG. 2.

Analgesia and anæsthesia in Case 1 after resection.

For convenience of discussion the clinical progress, in a large proportion of nerve injuries, may be said to follow one of the four following courses (although, it must be understood, it is not possible to include a few cases exhibiting several complications in such a graphic manner).

(*a*) Improvement seen in the sensory manifestations within a few weeks, followed by restoration of tone and voluntary contraction in the paralysed muscles. This is succeeded by a steady increase in power until there is a complete recovery within four to eight months. The cases following this course are probably examples of physiological division, the missile having passed close to the nerve without dividing any fibres and the wound healing without any compression of the nerve.

(*b*) No improvement of any form even after four to six months. All of these cases are clinically examples of complete anatomical division, and surgical means alone can procure any recovery.

In these two diverse groups the treatment is obvious, but in the next considerable difficulties are encountered.

(*c*) Fairly rapid improvement in the sensory or motor symptoms, or both, up to a point when further progress becomes more tardy but very slowly continues. These are possibly instances of incomplete anatomical division, but the divided fibres regenerate because they are in good apposition, and there is a minimal amount of cicatricial tissue. Surgery cannot accelerate the recovery of this group and the essential point is to differentiate it from the succeeding one. As Sherren[1] has shown, in cases of incomplete division the recovery of epicritic and protopathic sensibility is simultaneous.

(*d*) Improvement, which abruptly ceases or is followed by a relapse. This is an important group and contains a considerable number of cases. The relapse, as may be anticipated, is almost invariably due to compression of the nerve by fibrous tissue or callus.

In the cases of relapse or sudden cessation of all recovery the nerve is found on exposure to be compressed by fibrous tissue, or to contain a fibroma or extensive intraneural scar. The progress or regeneration is interrupted by the excessive formation of fibrous tissue, which usually necessitates neurolysis or excision of the fibroma with suture of the divided fibres, and therefore it is of the utmost importance to be able to diagnose this class of case as soon as possible from those in the previous group, where recovery will generally occur without surgical intervention.

From my own experience it seems possible to recognise the presence of compression of a nerve in most cases by means of the simplest clinical tests for the cutaneous sensibility to "light touch" and "pain" in its sensory distribution. The following cases illustrate this possibility.

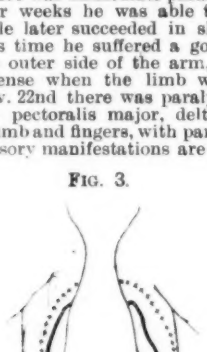
CASE 1.—Private —— received on May 9th, 1915, a gunshot injury on the inner side of the left arm about 2 inches above the internal condyle of the humerus. He was first seen by me on Sept. 15th, when there was a complete paralysis of all the muscles supplied by the ulnar nerve and sensory symptoms indicated in Fig. 1. It will be immediately noticed that the analgesia was more extensive than the anæsthesia (lightest touch). He had suffered from a burning pain in the palm of the hand for the previous two months, but this was diminishing in intensity and totally disappeared about the end of September. No improvement occurred and he was operated on by Captain H. Buck on Nov. 12th. At the operation the nerve was found to be firmly adherent to the inner head of triceps; its most internal fibres had been divided and a fibroma had developed between their lacerated ends. A few apparently normal fibres were to be seen on the outer side. About one inch of the nerve with the fibroma was resected and the divided ends sutured and protected with a covering of fat. Microscopic examination of the excised piece showed three bundles of nerve fibres intact, but the rest had been strangled by the dense fibrous tissue. Sensation was tested six days after the operation, and it was found that the analgesia was now less extensive than the anæsthesia as shown in Fig. 2 (the dissociation is the reverse of that seen in Fig. 1, before operation).

CASE 2.—Private —— received on August 8th a shell injury of the left shoulder, the piece entering just below the spine of the scapula and emerging through the inner third

[1] J. Sherren; Injuries of Nerves and their Treatment.

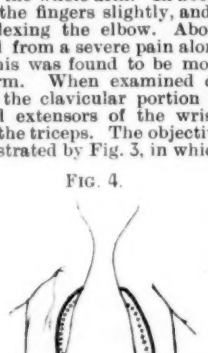
of the clavicle, causing a comminuted fracture of that bone. There was immediate paralysis of the whole arm. In about four weeks he was able to flex the fingers slightly, and a little later succeeded in slowly flexing the elbow. About this time he suffered a good deal from a severe pain along the outer side of the arm, and this was found to be more intense when the limb was warm. When examined on Nov. 22nd there was paralysis of the clavicular portion of the pectoralis major, deltoid and extensors of the wrist, thumb and fingers, with paresis of the triceps. The objective sensory manifestations are demonstrated by Fig. 3, in which

FIG. 3.



Analgesia and anæsthesia in Case 2 before neurolysis.

FIG. 4.

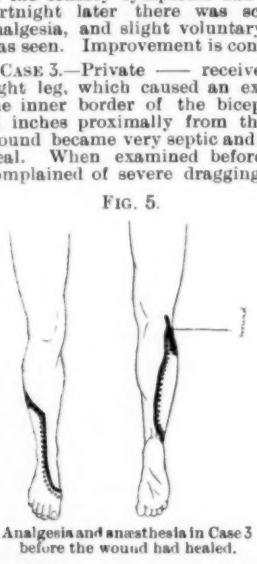


Analgesia and anæsthesia in Case 2 a fortnight after neurolysis.

it will be seen the analgesia is much more extensive than the anæsthesia. At the operation, performed by Captain Buck, the posterior cord of the brachial plexus was found to be strongly adherent to the posterior aspect of the clavicle in the region of the fracture. No evidence could be found of any division of nerve fibres. When examined two weeks after the operation it was found that the type of dissociation in the sensory symptoms had been reversed. (Fig. 4.) A fortnight later there was scarcely any anæsthesia or analgesia, and slight voluntary contraction of the deltoid was seen. Improvement is continuing.

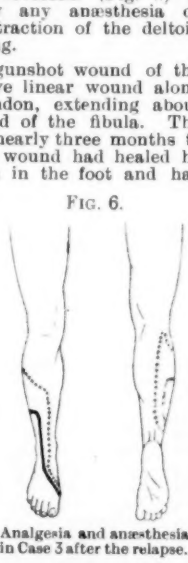
CASE 3.—Private —— received a gunshot wound of the right leg, which caused an extensive linear wound along the inner border of the biceps tendon, extending about 4½ inches proximally from the head of the fibula. The wound became very septic and took nearly three months to heal. When examined before the wound had healed he complained of severe dragging pain in the foot and had

FIG. 5.



Analgesia and anæsthesia in Case 3 before the wound had healed.

FIG. 6.



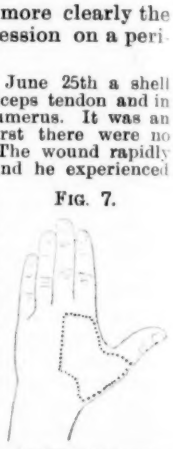
Analgesia and anæsthesia in Case 3 after the relapse.

paralysis of the anterior tibial and peroneal muscles. On testing the sensibility it was found that the losses to "light touch" and "pain" respectively were almost coterminous (Fig. 5), the condition usually found in complete division of the external popliteal nerve. During the next few weeks there was a gradual recession of the proximal limit of the anæsthetic and analgesic areas and some voluntary contraction in the extensor longus hallucis and extensor longus digitorum, but this was only maintained until about a fortnight after the wound had healed when a relapse occurred. The pain ceased, there was no longer any voluntary contraction in the anterior tibial muscle and the analgesic area was found to be very considerably greater than the area of anæsthesia (Fig. 6), which was not quite so extensive as at the outset. At the operation Captain E. D. Telford found the external popliteal nerve incompletely divided and embedded in an enormous mass of hard fibrous tissue and it was found necessary to resect a portion of the nerve. Unfortunately I was unable to again examine this case after the operation owing to its transfer to a distant hospital.

The following two cases show more clearly the development and effect of compression on a peripheral nerve.

CASE 4.—Rifleman —— received on June 25th a shell wound on the outer side of the left biceps tendon and in front of the external condyle of the humerus. It was an uncomplicated flesh wound, and at first there were no manifestations of any nerve injury. The wound rapidly healed, and soon after it became sound he experienced difficulty in raising his wrist. This became gradually worse, until he was quite unable to extend his wrist, thumb, or fingers. When examined at this time he had complete flaccid paralysis, with wasting of all the muscles supplied by the posterior interosseous nerve, and complained of pain in the thumb and dorsum of the hand, but there were no objective sensory symptoms. In a few weeks the pain subsided and an analgesia, whose distribution is demonstrated in Fig. 7, appeared. There was no loss to light touch. This condition persisted for one month, during which time the paralysed muscles were constantly relaxed on a splint and regularly massaged. At the end of this time the extensors of the wrist exhibited signs of tone, and later a little voluntary contraction. This was succeeded by a gradual reduction in the area of analgesia, and now there are no sensory manifestations and full power has practically returned in the affected muscles.

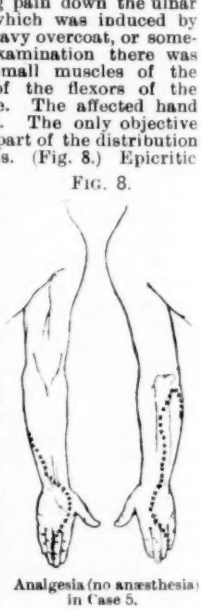
FIG. 7.



Analgesia (no anæsthesia) in Case 4.

CASE 5.—Private —— whilst in the Dardanelles noticed that his left hand began to lose its power after about half an hour's trench digging or rapid fire. The weakness rapidly increased, and he also observed wasting of the hand. In addition he suffered from a shooting pain down the ulnar border of the forearm and hand which was induced by carrying anything or wearing his heavy overcoat, or sometimes even by his braces. On examination there was paresis with atrophy of all the small muscles of the hand, and also slight weakness of the flexors of the fingers, especially on the ulnar side. The affected hand was dry, cold, and slightly cyanosed. The only objective sensory symptom was analgesia over part of the distribution of the inner cord of the brachial plexus. (Fig. 8.) Epicritic sensibility, even to the compass test, was unaffected throughout. An X ray examination showed a cervical rib on the right side, but none on the affected side. At the operation, performed by Captain Telford, a very large contribution from the first dorsal root was found ascending in a deep groove on the inner border of the first rib to join the last cervical nerve. There was no compression of the subclavian artery. The portion of rib obviously compressing the first dorsal root was excised. On the following day (24 hours after the operation) the hand was warm and moist, and the analgesia had completely disappeared. The capillary circulation was still a little sluggish, but there was no cyanosis, and the man volunteered the information that "during the night he had felt the blood pumping through his left hand for the first time as long as he could remember." (A full report of this interesting case will be published subsequently in a separate paper.)

FIG. 8.



Analgesia (no anæsthesia) in Case 5.

All these cases exhibit a dissociated type of sensory disturbance; in each the area in which there is a loss of sensibility to pain (tested by pinprick) is greater than that in which the loss to light touch (tested by camel hair brush) occurs, a syndrome which is the reverse of that enunciated by Head, Rivers, and Sherren[2] for injuries of peripheral nerves. I have discovered this type of

[2] H. Head, W. H. R. Rivers, and J. Sherren: Brain, vol. xxviii., 1905.

dissociation in 15 additional cases, but have failed to find it in the examination of recent injuries. In every case where it was found it developed after the wound had healed. In this connexion it is interesting to note that my attention was first directed to this dissociation by Captain D. E. Core, who was at the time examining old cases, whereas I was seeing only the recent ones, and it was only later when I began to see it develop that I realised its significance. All the examples of this dissociation which have come to operation show one pathological condition in common—namely, compression of a nerve which is undivided or incompletely divided.

In the first three cases described the compression was observed on exposure of the nerve. In the first the dissociation was reversed by complete division, in the second by neurolysis, whilst in the third unfortunately I was unable to make an examination after the operation. In the fourth case the position and character of the injury and the very late onset of the nervous symptoms indicate compression by the contraction of the scar. The manifestations were not so profound as in the former cases, and recovery occurred without neurolysis. The fifth case—compression of the first dorsal contribution, to a probably post-fixed brachial plexus, by a normal first rib—proves still more clearly the effect of pressure and the rapid relief to be obtained in early cases by its removal.

These observations seem to show that the first signs of compression are manifested by loss of conduction in the motor fibres and severe pain, which are succeeded by analgesia and diminution (later disappearance) of the subjective pain, and later tactile anæsthesia, which is never so widespread as the analgesia. Any reference to thermal anæsthesia is here omitted as it is not so conveniently tested clinically as "pain" and "light touch," which appear to give the necessary practical information. The simple examination required enhances the clinical value of this sign. This form of dissociation can be rapidly tested, and the only conditions with which it can possibly be confused are complete division of posterior roots and perhaps syringomyelia; but these errors may easily be avoided.

It is unnecessary to account for the frequency of the signs of compression in military cases after Bowlby's[3] recent description of the way in which all bullet or shell fragments, moving at immense speed, not only shatter the structures in the line of their flight, but by their divulsive force shatter and lacerate the surrounding tissues for remarkable distances in all directions. This form of dissociation is not only of importance in diagnosing compression, but also useful in proving the relief of compression after neurolysis.

It is not intended here to refer to the theoretical significance of this phenomenon, but it is of interest to mention the hypothesis, supported by Ranson's[4] recent work, that the afferent fibres conducting protopathic sensibility are non-medullated.

[3] Bowlby: Bradshaw lecture, Wounds in War, THE LANCET, Dec. 25th, 1915.
[4] S. W. Ranson: Unmyelinated Nerve Fibres as Conductors of Protopathic Sensation, Brain, vol. xxxviii., 1916.

Dr. F. T. Underhill, medical health officer of Vancouver, in presenting his annual report for 1915, lays chief stress on the need for thorough inspection of all foods and their distribution, and the inspection of dairy-farms, milk- and other food-shops, and food-hawkers. He notes that after two or three years' steady work bakehouses are all free from vermin, and wrapped bread can be had from all bakers.

INVESTIGATIONS OF STRAINS OF TUBERCLE BACILLI DERIVED FROM SPUTUM.

BY A. STANLEY GRIFFITH, M.D. VICT.
(*For the Medical Research Committee.*)

IN May, 1914, I communicated to the *British Medical Journal*[1] the results to that date of investigations of strains of tubercle bacilli derived from the sputum of phthisical persons. Since then I have isolated and investigated a further series of cultures from sputum. These additional strains of tubercle bacilli were obtained in the course of experiments made in test of a simple method, mentioned in my last paper, of raising cultures directly from sputum by means of antiformin. I have also completed the investigation of four atypical sputum strains which were omitted from the report on the last series because their biological characters had not then been satisfactorily established. As my work on these lines is for the time being at an end (September, 1915), I propose in this paper to summarise the whole of my observations upon the types of tubercle bacilli in the sputum of consumptives. The total number of strains of tubercle bacilli isolated by me from sputum is 212. Of these, 29 were investigated for the Royal Commission on Tuberculosis,[2] 152 for the Grocers' Company, and the remainder (31) on behalf of the Medical Research Committee.

The subject-matters of this report will be dealt with in order as follows: (*a*) Outcome of my observations on the sputa of 31 additional cases of phthisis pulmonalis. (*b*) The biological characteristics of four atypical sputum strains from Series 2. (*c*) Analysis of the results obtained in examination of sputum from 212 cases of phthisis pulmonalis. (*d*) My further experience of antiformin as a means of eliminating from sputum and from tuberculous tissues all micro-organisms other than B. tuberculosis.

(*a*) *31 Additional Strains.*

Thirty-one new strains of tubercle bacilli have been raised from sputum. The patients from whom the sputum samples were derived varied in age from 17 to 53 years; 15 were under 25 and 3 were over 40. Of the patients 12 were females and 19 were males. I am indebted to Dr. W. M. Elliott, Ruchill Hospital, Glasgow, and Dr. J. W. Allan, Bellefield Sanatorium, Lanark, for specimens of sputum from 28 persons, and to Mr. P. C. Varrier-Jones, Cambridge, for the specimens from the other three.

A small quantity of each sputum sample was inoculated intraperitoneally into one guinea-pig. Of the 31 guinea-pigs so inoculated two died prematurely; the rest developed typical general tuberculosis. Direct cultures were sown from each sputum after treatment with antiformin, and in this way cultures of tubercle bacilli were isolated from 26 of the samples. From the remaining 5 samples, as well as from 8 which had yielded cultures direct, cultures were derived through the guinea-pig. The cultures have been tested as to their cultural characteristics only. Each of the strains has produced on bovine serum good growths with yellow pigment, and on glycerine agar, potato or broth the luxuriant creamy wrinkled layers which are characteristic of the human type of tubercle bacillus.

In order to ascertain whether or not a strain is capable of producing pigment on serum it is essential to use bovine serum which is of yellow colour when coagulated. The serum I have used for subcultures has, during the greater part of my work at Cambridge, been obtained from a single animal, a Shorthorn cow, which is kept at the farm for the sole purpose of supplying serum. Different batches of serum from this cow have varied in colour, when coagulated, from pale yellow to golden yellow, but all have favoured the production of pigment. On a golden yellow serum the human type of tubercle bacillus produces a rich yellow, often orange-yellow, pigment. With a less yellow serum the colour of the pigment varies from light cream to yellow. On a colourless serum, such as is usually obtained from the calf, pig, goat, or horse, the growths of human tubercle bacilli are greyish or greyish-white and are not pigmented. Standard bovine cultures have never in my experience produced bright yellow pigment, even on a golden yellow serum. Yellow pigment in a serum culture is therefore a character of considerable differential value.

(*b*) *Four Atypical Strains.*

With the exception of the majority of strains derived from lupus and of a few mixed strains, all the strains of tubercle bacilli of human origin upon which I have previously reported have been readily classified as either of bovine or of human type. This classification has been based upon the characters of growth on artificial media and the virulence for certain species of animals, the rabbit being the standard test animal. The deviation from type observed in the majority of lupus tubercle bacilli has been in respect to virulence, the cultural characters of these strains having been those of either the human type or the bovine type of tubercle bacillus.

During my work on tuberculosis in Cambridge I have obtained now and again from various kinds of human tuberculosis strains of tubercle bacilli which have displayed another kind of anomaly. These strains have exhibited standard (mammalian) virulence, but have not corresponded to either of the two mammalian types of tubercle bacilli in respect to their cultural characters. Of this new variety of tubercle bacillus I have obtained four strains from sputum. The following is an account of the biological properties of each such strain, together with an abstract of clinical notes of the case in each instance. For the latter I am indebted to Sir Robert Philip and Dr. J. J. Perkins.

CASE 1.—A woman, aged 24, was admitted to Brompton Hospital in 1911. The upper and lower lobes of both lungs were affected. The duration of the lung trouble was stated to be about three years.

Bacteriological Investigation.—Sputum obtained in May, 1912, was muco-purulent and contained fairly numerous T.B.; majority of medium length, a few long and beaded. A culture was isolated direct. Subcultures on serum were luxuriant, and on a yellow bovine serum exhibited a rich yellow pigment. On glycerine serum growth was luxuriant, pigmented, more heaped up than on serum, parts being wrinkled and warty. On glycerine agar at the end of a month growth was partly grey and translucent and partly creamy-white and wrinkled. After three or four months' incubation the major part of the layer was creamy, wrinkled, and of moderate thickness, the rest being grey and like ground glass. Similar growths were obtained on several agar tubes, and they differed from those ordinarily produced by standard human tubercle bacilli in being less abundant, not so uniform, and slower in attaining the maximum. On glycerine potato the most usual result in upwards of 24 tests was the production of a thin grey layer in which secondary colonies appeared after from two to three months. On further incubation these colonies increased slowly in size, becoming very irregular and bizarre in shape, resembling those often produced by bovine tubercle bacilli on this medium. Occasionally the growths were greyish-yellow and granular, but not much raised. On one occasion a moist, whitish, finely wrinkled but not thick layer was produced. On glycerine broth the best growth obtained after many attempts was a moist, greyish-white, mottled, not thick pellicle covering two-thirds of the surface, the rest being covered by extremely delicate transparent film.

A rabbit inoculated subcutaneously with 35 mg. of culture was killed 124 days after inoculation. The necropsy showed a small local lesion, partial caseation of one scapular gland, and scattered miliary tubercles in the lungs. Two guinea-pigs inoculated subcutaneously (one partly intraperitoneally), each with 0·1 mg., died of typical tuberculosis in 47 and 149 days respectively.

CASE 2.—Sputum from a woman aged 23 was received in January, 1912. She was suffering from pulmonary tuberculosis and had a blood-stained muco-purulent expectoration containing numerous beaded T.B.

Bacteriological Investigation.—A culture was obtained direct from the sputum. Subcultures on serum and glycerine serum were identical with those of Case 1 strain. On glycerine agar growth was difficult to obtain, the majority of the tubes sown showing no visible growth after several months' incubation. On other agar tubes there was in the second month a definite but extremely thin filmy grey layer, around the margins of which, under low magnification, very minute discrete colonies could be seen. After further incubation, up to four months, secondary colonies were seen in the thin grey layer, but these were only just visible to the naked eye and were grey and filmy or greyish-white. After incubation up to six months the appearances were the same as after three and four months. On glycerine potato in the great majority of cases only a thin grey layer was produced after several months' incubation. In one tube numerous secondary colonies developed in the thin grey layer, but these remained minute. In another tube, after nine months' incubation, there was a thin, moist, greyish-white layer containing half-a-dozen creamy warty colonies up to a millet seed in size. On glycerine broth only a few filmy grey islands of growth have been obtained.

A rabbit inoculated subcutaneously with 45 mg. of culture and killed 124 days later showed a local lesion and moderately severe tuberculosis of the lungs only. Another rabbit inoculated subcutaneously with 10 mg. of culture and killed 97 days later also showed a local lesion and moderate tuberculosis of the lungs only. A culture from the lung of the latter rabbit resembled the original. Three guinea-pigs were inoculated, each with 0·1 mg. One, intraperitoneally inoculated, died in 27 days of typical subacute general tuberculosis. Of the two subcutaneously inoculated guinea-pigs one died in 61 days of general tuberculosis; the other died in 114 days of chronic general tuberculosis of fibroid type. Cultures from two of the guinea-pigs were identical in cultural character with the original.

CASE 3.—A woman, aged 31, was admitted to the Royal Victoria Hospital, Edinburgh, on March 20th, 1913, on account of cough, loss of appetite, and weakness. The duration of illness was stated to be six weeks. Personal and family history unimportant. On examination she showed bilateral pulmonary tuberculosis, more extensively involving right side, where there was evidence of vomication. There was marked constitutional disturbance. The patient died some time later in a home for incurables.

Bacteriological Investigation.—Thick muco-purulent sputum was received in November, 1913. It contained very numerous tubercle bacilli; many were long, curved, and beaded. A guinea-pig inoculated intraperitoneally with the sputum died in 32 days of typical general tuberculosis. A rabbit inoculated subcutaneously and killed 92 days later showed no more than a small local lesion and a caseous focus in one adjacent gland. Cultures were isolated directly from the sputum. Subcultures on serum and glycerine serum were luxuriant and pigmented like those of the strain from Case 1. On other media containing glycerine growths were very sparse and closely resembled those produced by the strain from Case 2. A rabbit inoculated subcutaneously with 15 mg. of the culture and killed 101 days after inoculation showed a small softened caseous lesion and three tubercles in the lungs only. A culture recovered from one of these tubercles resembled the orginal culture in cultural characteristics and in virulence for the rabbit.

CASE 4.—A woman, aged 38, was admitted to the Royal Victoria Hospital, Edinburgh, in August, 1913, on account of cough, breathlessness, &c. The duration of her illness was stated to be 14 months. Examination revealed extensive involvement of left lung and slighter involvement of right apex. Systemic disturbance marked. Sputum showed moderate numbers of T.B. during first five months' treatment; thereafter the examination was negative. The patient improved considerably under treatment, and on discharge there was diminution in the area involved and T.B. were no longer detected in the sputum.

Bacteriological Investigation.—A sample of the sputum received in November, 1913, was thick, viscid, and contained a moderate number of T.B., mainly long, curved, and beaded. A rabbit inoculated subcutaneously with a small amount of the sputum and killed 95 days later showed a local lesion, a dozen tubercles in the lungs, and one tubercle in a kidney. Cultures were isolated directly from the sputum. The cultural characteristics of the strain were practically identical with those of the strains from Cases 2 and 3. A rabbit inoculated subcutaneously with 24 mg. of the culture and killed 101 days later showed

a cystic caseous lesion, partial caseation of the nearest glands, scattered miliary tubercles in the lungs, and one tubercle in a kidney. A culture derived from the lung lesions of the rabbit was identical with the culture inoculated in cultural characteristics and in virulence for the rabbit. Two guinea-pigs inoculated subcutaneously each with 1 mg. of culture died of typical general tuberculosis in 75 days.

On the clinical side the cases have not presented any unusual feature. With regard to the biological properties of the strains isolated, it must first be noted how in most particulars the strains resemble the human type of tubercle bacillus. All the strains have produced in the rabbit and the guinea-pig the pathogenic effects of standard human tubercle bacilli. They resemble human tubercle bacilli also in their mode of growth on serum and glycerine serum. Microscopically the strains exhibited very irregular morphology, and there were many long, curved, and beaded forms both in the sputum and in cultures. They differ from standard human tubercle bacilli only in the way they grow upon glycerine agar, potato, and broth. On these media they are dysgonic, and save for very minor differences on glycerine agar have displayed characters which would entitle them to classification with bovine tubercle bacilli. The cultural features of three of the strains were practically identical. The other strain produced moderately good growth on agar, not equal to that of standard human tubercle bacilli, but growths definitely dysgonic on potato and broth.

The growths on serum and glycerine serum of all the strains so closely resembled those of standard human tubercle bacilli that at first I was of the opinion that my failure to get similar characteristic growths on other media was due to faulty technique —i.e., to the use in the tests of not sufficiently vigorous subcultures or to unfavourable media. The tests were therefore repeated again and again, but always with the same results. Two of the strains have been under observation for more than three years, and have been subcultivated on serum upwards of 60 times. Even after this prolonged subcultivation there has been manifested no increased capacity to grow on glycerine agar, potato, or broth. The same stability of cultural characters has been presented by each of the other strains after a period of observation of two and a half years. The distinctive cultural features of each strain have been retained also after subcultivation for several generations on glycerine serum and (of three strains) after passage through the bodies of animals (rabbits and guinea-pigs). These strains appear therefore to be stable new varieties of the tubercle bacillus, and on account of their closer resemblance to the human than to the bovine type of organism I have provisionally classified them as atypical human tubercle bacilli.*

The detection of these varieties of tubercle bacilli emphasises the importance of complete study of cultural characteristics of tubercle bacilli. In order to ensure that examples of this class of strain are not overlooked, it is essential to use for testing purposes not only a variety of glycerine media but also a serum which favours the production of pigment. The errors of classification which might have been made in these cases by a too restricted variety of culture tests are the following. If the serum used had been colourless or of poor quality distinctive (pigmented) growths would not have been secured, and the strains would have been classified as dysgonic with the pathogenicity of standard human tubercle bacilli. On the other hand, if the culture tests had been limited to egg and serum, with and without glycerine, the strains would not have been recognised as anomalous and would have been classified with standard human tubercle bacilli.

(c) *Analysis of Results obtained from Investigation of Sputum of 212 Phthisis Patients.*

The following table records the bacteriological results obtained in the examination of sputum from 212 cases of phthisis pulmonalis:—

	Number of cases.	Type of tubercle bacillus isolated.		
		Standard human.	Atypical human.	Standard bovine.
England... ...	139	135	2	2
Scotland... ...	73	70	2	1
Total... ...	212	205	4	3

It is notable that of my series of 212 sputum examinations 3 only (1·4 per cent.) yielded tubercle bacilli of bovine type. Also that in each of these 3 cases, though the sputum was repeatedly tested, none but bacilli of the bovine type were on any occasion isolated.† No other investigator in this country has cultivated from tuberculous sputum any but tubercle bacilli of human type, this result being recorded by Bulloch[3] and Cobbett[4] in regard to 23 and 2 cases respectively, and by Cruickshank[5] in reference to an unspecified number of observations. This great preponderance in pulmonary tuberculosis of the human to the exclusion almost of the bovine tubercle bacillus is in striking contrast to the relative frequency with which bovine tubercle bacilli occur in surgical tuberculosis and in the tuberculosis of childhood.

In this country, therefore, pulmonary tuberculosis which has arrived at the ulcerative stage is but very rarely referable to tubercle bacilli of bovine type. And elsewhere than in Britain an even smaller proportion of the sputa of persons suffering from pulmonary tuberculosis has yielded bacilli of bovine type. Out of 736 cases tested by foreign investigators 3 only yielded bovine tubercle bacilli; and further, in 2 of these 3 the bovine bacillus was only sparsely mixed with preponderating bacilli of human type, while in the third case proof was not afforded (only a single examination of the sputum having been made) that in this instance also both types of tubercle bacillus were not coexistent in the lungs of the patient.

(d) *Method of Obtaining Cultures of the Tubercle Bacillus by means of Antiformin.*

The simple method which I described in my last paper of obtaining cultures direct from sputum by means of antiformin has proved on more extended trial to be very trustworthy. This method was the outcome of the observation that the presence of free antiformin in a tuberculous fluid used for sowing cultures was not detrimental to the growth of the tubercle bacillus. There is no need, therefore, to centrifuge the bacilli and wash them free from antiformin before sowing. In fact, it is unadvisable in cultivation experiments to allow an antiformin sputum mixture to become so fluid that it is possible to centrifuge the bacilli. The method is carried out as follows:—

Equal volumes of dilute antiformin‡ and sputum are pipetted with a wide-bore pipette into a small test-tube and

* Since this paper was written Eastwood and F. Griffith have reported in the Journal of Hygiene (Vol. XV., No. 2, Jan. 14th, 1916) the isolation of similar atypical strains from cases of bone and joint tuberculosis. These strains will be more particularly referred to in my shortly forthcoming report on bone and joint tuberculosis, from which variety of tuberculosis I, too, have isolated several atypical strains.

† For details of these three cases see references 1 and 2.

‡ Antiformin, D.R.P., a mixture of sodium hydrate and Eau de Javelle.

thoroughly mixed. At intervals subsequently one loopful of the mixture is spread evenly over the surface of egg medium and the tubes are then incubated. By means of this simple procedure I obtained pure cultures of tubercle bacilli from 26 of the 31 new samples of sputum. In each experiment the volume of the sputum taken was about 1 c.c. and this was mixed with an equal volume of a 10 per cent. dilution of antiformin, thus forming a 5 per cent. antiformin sputum mixture. Egg tubes were sown with this mixture at intervals of 5 (sometimes 10) minutes during the first 30 minutes, the first tube being sown 5 minutes, occasionally 10 minutes, after the mixture was made. Tubes were also sown in many instances after longer intervals, up to 24 hours.

In 5 out of the 31 experiments the method failed. Twice all the culture tubes sown became overgrown in 24 hours, the antiformin not having been in sufficient amount to kill the microbes present in the particular sputum. In 3 experiments all the tubes sown remained sterile; tubercle bacilli were numerous in one of these sputum samples, scanty in the other two. In these three cases the concentration of antiformin was too high and tubercle bacilli as well as other organisms were destroyed.

In all the 26 positive experiments the mixtures were free from living organisms other than tubercle bacilli in 20 minutes or less. In 12 experiments pure cultures of tubercle bacilli were obtained after the antiformin had acted for about 10 minutes, and in 7 experiments after exposure for only 5 minutes. These experiments show how speedily organisms other than tubercle bacilli succumb to the action of antiformin. On the other hand, tubercle bacilli themselves did not long resist the action of 5 per cent. antiformin. In 13 experiments mixtures which yielded pure cultures of tubercle bacilli after 10 minutes' exposure to 5 per cent. antiformin were sterile after further periods of 5 or 10 minutes. The sputa in these cases were thin and mucinous, and in such sputa the resisting power of the tubercle bacillus is apparently little greater than that of the other microbes present. This was well shown in one experiment. An egg tube sown 5 minutes after the sputum and antiformin were mixed yielded an abundant growth of ordinary organisms after 24 hours' incubation. A tube sown 10 minutes after mixture grew a pure culture of tubercle bacilli. Tubes sown 15 and 20 minutes after mixture remained sterile. In several other experiments tubercle bacilli have appeared to survive other organisms not longer than 5 minutes.

It is evident from these results that with thin sputa the margin of time available during which pure cultures of tubercle bacilli are possible from a mixture may be very brief. When the sputum was thick the tubercle bacilli escaped early destruction, and such mixtures were found capable of producing cultures 24 hours after the sputum and antiformin were mixed. While 5 per cent. antiformin has given good results, so low a percentage has certain disadvantages for routine use. When the sputum is at all tenacious some time may elapse before organisms other than tubercle bacilli are destroyed and many may escape destruction altogether. Owing to this uncertainty it is necessary to sow cultures after many different intervals, thus greatly prolonging the period of the experiment. With a view of ascertaining whether higher percentages of the inhibiting agent would be more advantageous many comparative experiments with different proportions of antiformin have been made. In these experiments emulsions of tuberculous organs of guinea-pigs and rabbits have been employed as well as sputum.

The results of these additional observations, the details of which will be published at a later date, have led me to the conclusion that it is more advantageous, especially when dealing with tenacious sputum, to use high percentages of antiformin with short exposure than low percentages with long exposure. An opinion in this sense has also been expressed by McFadyean and Knowles.[6] For routine use 15 per cent. antiformin in the sputum mixtures is to be recommended, because there is not so much necessity for haste in sowing cultures as with still higher percentages. The first sowing should be made one to two minutes after mixture according to the consistency of the sputum, and three tubes at least ought to be sown within the first five minutes. Thereafter the intervals may be longer—five minutes—especially if the sputum remain undissolved and mucinous. There is no need to sow tubes after 20 minutes or after the sputum has completely dissolved.

The work here reported on has been carried out in the Pathological Department of the Field Laboratories, University of Cambridge, on behalf of the Medical Research Committee.

References.—1. Brit. Med. Jour., May 30th, 1914. 2. Final Report of the Royal Commission on Tuberculosis, Part II., Appendix, vol. i., pp. 8–10 and 149–152. 3. Horace Dobell Lecture, Royal College of Physicians of London, 1911. 4. Second Interim Report of the Royal Commission on Tuberculosis, Part II., Appendix, vol. ii. 5. Brit. Med. Jour., Nov. 9th, 1912. 6. Journal of Comparative Pathology, vol. xxviii., Part 2.

PAIN IN RENAL AND VESICAL LESIONS:

ITS CHARACTERISTICS, ITS ANOMALIES, AND ITS MISGUIDING MANIFESTATIONS, WITH 12 ILLUSTRATIVE CASES.

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(*Continued from p. 674.*)

Causes of Pain in the Bladder.

LOCAL pain may be caused by any diseased condition of the bladder, giving rise to irritation of the terminal filaments of the sensory nerves supplying the mucous membrane, but as a rule little suffering is complained of unless the trigone or the neck of the bladder is involved in the lesion. When the pain is constant it is generally of a dull aching character and is located behind the symphysis pubes. Such pain is seen in encysted calculus at the base of the bladder and in chronic prostatitis. It is not relieved by emptying the bladder as it is in acute prostatitis, in tuberculosis, and in chronic cystitis. It is remarkable how free from pain some diseases are, such as papilloma, cystitis due to bacillus coli infection, and tuberculous disease involving the anterior wall. While, on the other hand, suffering, which may appear to be altogether out of proportion to the extent of the lesion, may be met with when it is located at the neck or in the first part of the urethra. Then the pain is sharp and agonising, especially during and after micturition. When the mucous membrane is intact the pain is not generally very great, but if it becomes eroded or ulcerated the suffering is more or less constant, is greatly increased when the bladder is evacuated, and the suffering continues after the termination of the act. With the exception of cases of stone the pain is worst at nights.

Referred pains in bladder affections extend more to the parts behind and below than to those above—that is to say, to the third and fourth sacral segments, and less frequently to the first, second, and third lumbar. So it is found that most patients complain of pain behind the sacrum, almost in the middle line, over the hips, and in the perineum, whereas a few may find that it extends to the back part and outer side of the hips or to the feet. (Fig. 6.) Occasionally pain passes to one or both kidneys, but how far this is due to nerve reflex or to backward fluid pressure it is often difficult to say. The conditions which cause pain are: (*a*) cystitis, especially when the lesion involves the neck of the bladder or the trigone, and when ulceration has been induced; (*b*) pericystitis; (*c*) retention of urine; (*d*) tuberculosis; (*e*) tumours; (*f*) rupture of the bladder; and (*g*) cystalgia.

Differential Diagnosis of the Renal Lesion Causing Pain.

Under normal circumstances moderate pressure upon the kidneys through the abdominal parietes does not produce pain or even discomfort; it may, indeed, be laid down as a principle that when such pressure induces pain there is some alteration in the kidneys. Undue tenderness shows itself in increased muscular resistance to pressure with the hands. In order to determine increased sensitiveness in the kidney, the patient lying upon his back with the knees well elevated by pillows, the surgeon should pass one hand behind the lumbar region, and with the other hand exert gentle but firm pressure in the direction of the kidney. When the muscular resistance is overcome and the pressure continued a peculiar, deep, dull, sickening feeling is experienced by the patient, which as a rule he can easily distinguish from the superficial aching consequent upon the compression of muscle.

Another method of determining the sensitiveness of the kidney is to give a sharp knock or tap in the lumbar region. In some diseases, most notably in renal calculus, a sharp, stinging pain is thereby produced. The one side should be carefully compared with the other. When present, increased sensitiveness is a useful guide, but its absence has no significance, as in many serious renal lesions pressure does not produce suffering.

Spontaneous pain in the lumbar region or in other well-recognised areas is the very common complaint in kidney disease, but its character and situation vary according to circumstances, and may often guide the surgeon in forming an opinion as to the nature of the lesion giving rise to the suffering. The feeling may only amount to a sense of uneasiness or discomfort; it may be a dull or gnawing pain; it may be very acute at times or may reach to a degree to be described as lacerating torture, accompanied by agonising spasms. The suffering may be of short duration, with intervals of complete freedom from pain, or it may be persistent. The less severe pains as a rule continue steadily in their course and are located in one place, while the more acute pains are generally remittent and extend over considerable areas. Dull persistent pain in most cases indicates a slow, steady change in the condition and bulk of the renal parenchyma or in the size of the pelvis, as is seen in tuberculous nephritis and in tumours. On the other hand, acute suffering is due to lesions which suddenly interfere with the exit of urine from the pelvis; for example, in calculus, in tuberculous pyelitis or ureteritis, or in obstruction from the impaction of a blood clot. Very often the patient is able to distinguish more than one kind of pain—a dull, gnawing, local pain which is persistent, and a sharp, spasmodic, remittent pain.

The diseases of the kidney in which pain is a prominent symptom embrace all lesions which involve acute inflammation of the renal parenchyma or the pelvis, and those in which there is a condition causing sudden interference with the circulation of blood or an impediment to the escape of urine.

We may now consider how far pain in the region of the kidney may assist us in forming a diagnosis. It is not possible to classify surgical affections of the kidney according to the presence or absence of pain, for the greatest variation in this respect may be observed in the same disease in different individuals, or, again, a lesion which at one stage gives rise to little or no suffering may at a later period cause considerable pain. It may be generally stated, however, that in diseases where the increase in bulk of the organ is slow, or the distension of the pelvis is very gradual, the lesion is not characterised by much suffering—for example, in simple chronic hydronephrosis, in polycystic kidney, and in tuberculous nephritis without pyelitis. In calculus impacted in the substance of the kidney little pain may be referred to the organ, whereas such diseases as pyonephrosis, suppurative nephritis, perinephritic abscess, tuberculous pyelitis, and calculus in the pelvis or in the ureter, usually give rise to considerable pain.

Paroxysmal pain coming on for longer or shorter periods, with intervals of complete relief, is generally caused by some obstructive lesion, calculous obstruction, torsion of the ureters, obstruction by pus, tuberculous débris, hydatid cysts, or blood clot, or from spasm of the ureters. It may also be caused by the poisons of rheumatism or of gout, or by some of the malarial poisons.

On the other hand, persistent pain of renal origin is most likely to result from some inflammatory affection of the pelvis and ureter, the presence of an impacted stone, the existence of rapidly advancing malignant disease or of a tuberculous lesion, with ulceration of the pelvis. Sometimes, also, persistent pain may be induced by the irritation of highly acid urine.

The conditions causing pain are: (*a*) Movable kidney—(1) traction on the pedicle, (2) passive hyperæmia, (3) transitory hydronephrosis, and (4) reflex disturbance; (*b*) congestion; (*c*) inflammation, acute and chronic; (*d*) hydronephrosis; (*e*) pyelitis and pyonephrosis; (*f*) cystic degeneration; (*g*) perinephric abscess; (*h*) tuberculosis; (*i*) renal calculus; (*j*) malignant tumours; (*k*) renal infarction; (*l*) nephralgia; (*m*) aneurysm of renal artery and (*n*) rupture of the kidney.

(*a*) *Movable kidney.*—In this disease pain is very variable in degree, so that for sake of discussion the cases may be divided into two classes: (1) Those in which ill-defined pain, generally abdominal, but not specially referable to the renal region, is the most marked symptom; and (2) those in which the pain is distinctly renal and is associated with (*a*) albuminuria only, (*b*) albuminuria and tube casts, (*c*) hæmaturia, (*d*) transitory hydronephrosis, and (*e*) pyonephrosis.

In the *first class* the pain is seldom or never severe. The point from which it seems to radiate is halfway between the lower end of the sternum and the umbilicus, but there is no tenderness on pressure at the epigastrium, so often observed in the pains of gastric disorders. In this group the pain does not in any way resemble renal colic, not being due to obstruction to the escape of urine, but rather to be attributed to traction on the nerves supplying the kidney or to pressure upon those lying close to it.

The pain is generally dull, and may amount rather to what the patient describes as an "unendurable sense of weakness" in the abdomen and a "tired feeling in the back." The pain often extends down the thighs, and is not infrequently mistaken for "sciatica" or "lumbago," or may be attributed to "rheumatism of the muscles" or "disease of the hip-joint." The pain, however, is not limited to the sciatic nerve, but extends occasionally in the course of the anterior crural. It is unattended with pain on pressure of the nerve trunks and is accompanied by frequent desire to micturate. The pain is not influenced by exposure

to damp or cold, nor is it increased by pressure over the painful part. There is no loss of motor power, nor is there atrophy of muscles. It is increased by exercise and relieved by rest, especially in bed. It is not prone to exacerbations during the night, nor is it increased by standing or pressure over the hip-joint. From time to time there may be digestive disturbance, especially if the patient has been taking much exercise of a rough kind. While the pain varies from day to day, there are intervals of rest and complete comfort. During the time that the pain is most severe there may be a feeling of nausea, the pulse is not affected, the temperature is unaltered, while after the attack passes away there may be a sense of utter prostration.

Medicinal treatment may relieve any digestive disorders when carried out along with rest in bed, and the pain may pass away, but as soon as the patient begins to move about again the old troubles all return. This occurs time after time. The patient loses courage, and thinking that no one "understands her complaint" she becomes resigned to her fate, and goes on suffering until the renal condition is revealed and an operation performed.

The *second class* forms one of the most interesting groups in that the pathology is clearly defined, and the most satisfactory results are attained by treatment. A circumstance I have observed, and one that is worthy of note, is that in these cases there are no signs of a neurotic tendency. In all, the symptoms are simply those due to mechanical obstruction to the circulation or to the escape of urine from the kidney. The first three symptoms—namely, albuminuria, the presence of tube casts, and the appearance of blood—are clearly due to the obstruction of the circulation; whereas the two latter, hydronephrosis and pyonephrosis, are due to the obstruction to the urinary flow. When we consider the changes that take place when the kidney becomes movable, the effects produced by twisting of the vessels, the nerves, and the ureter, it is easily understood how pain is produced. Impediment to the flow of the arterial blood to the kidney is very rare.

In all cases that belong to this group the pain is referred to the region of the kidney as the site of its origin or of its greatest intensity, but in severe cases the pain radiates far beyond the lumbar region. When the displacement is such as to obstruct the venous return only, the suffering comes on gradually and is of a steady, dull aching character. When it is so complete as to cause hæmaturia the renal pain may begin very suddenly, simulating renal calculus, and may be accompanied by severe gastric disturbance, nausea, and vomiting. Occlusion of the ureter causes more severe pain than obstruction to the venous return, is associated with more or less swelling from distension of the pelvis, and is accompanied by retention of urine. When the obstruction to the venous return is slight and of short duration, the only changes observed are a diminution in the quantity of the excretion and the presence of albumin; but if the obstruction be serious and prolonged, tube casts may be found in the deposit, and the organ is increased in size.

Torsion of the renal vessels and of the ureter may lead to one or more of the following symptoms: 1. Albuminuria with or without tube casts. 2. Hæmaturia, sometimes coincident with blood casts in the urine. 3. Dull, aching pain in the renal region almost constantly present, and associated with occasional paroxysms of colic similar to that produced by calculus. But while the paroxysmal pain, the hæmaturia, and the general gastric disturbance are similar in character and in mode of onset to what is observed in calculous disease of the kidney, in addition to, and frequently coincident with, the symptoms just mentioned, there is sudden diminution in the quantity of the urine. The subsidence of the renal pain is soon, but not immediately, followed by copious flow of urine of high specific gravity, instead of low as in transitory hydronephrosis. The hæmaturia associated with blood casts in the urine, and the renal pain concurrent with sudden appearance of albuminuria and tube casts, are important circumstances in forming a diagnosis.

Impediment to the escape of blood along the veins produces increased vascular tension, indicated by pain, in most cases by slight, but in a few by considerable, increase in the size of the kidney, and in many cases by reduction in the quantity of the excretion.

When frequently repeated over a long period venous obstruction is certain to lead to atrophy of the organ, but fortunately the sickness and pain induced by the condition force the patient to take rest in bed; thereby often the normal position of the kidney is restored and the twisting of the pedicle rectified.

Displacement of the kidney may lead to impediment to the flow through the ureter in various ways: (1) By kinking from rotation of the kidney on its short axis; (2) by obstruction from bending of the ureter in some part of its course; and (3) by occlusion of the lumen of the duct through angular insertion of the ureter into the bladder. I have seen only 19 cases where the hydronephrosis was sufficiently large to be detected by the hand as a distinct swelling in the lumbar region. But judging from the symptoms observed in many other cases, I have little doubt that occasional and slight obstruction of the ureter occurs frequently, lasting, however, only for a short time—too short a time to allow much fluid to accumulate. The duration of undoubted cases of transitory hydronephrosis varies considerably. In 12 of the 19 cases just alluded to, the duration was not less than six hours. In some the attacks extended over 48 hours, and in a very few lasted for days.

As I have already demonstrated in published cases[1] while the pelvis of one kidney is becoming distended the function of the opposite organ may be suddenly inhibited, as shown by complete suppression. Examples of reflex inhibition of the functions of the kidney are numerous. For example, unilateral obstruction due to the presence of a calculus in one ureter may cause complete anuria, which may last for a considerable time. In some the inhibition of the function of the healthy kidney occurs at once; in others it is only when the hydronephrosis on one side reaches a certain point that the kidney on the opposite side fails to act.

As a rule, transitory hydronephrosis of one kidney is not associated with immediate suppression of the function of the opposite organ. The suppression usually only follows after a considerable interval of hours or even of days. The suppression may be followed by albuminuria, and this may be limited to the urine which is excreted by the kidney opposite to the one which is hydronephrosed. Again, in cases of transitory hydronephrosis the

[1] Renal Cases, 1899, p. 39, published by James Maclehose and Sons, Glasgow.

excretion of the opposite kidney may not be stopped but only altered in character, the most marked changes being increase in the specific gravity and the presence of albumin.

Reflex functional disturbance is seen in some of the more severe cases. Not only are the gastro-intestinal symptoms pronounced and the functions of the kidney markedly interfered with, but in some there may be symptoms indicative of more remote reflex functional disturbance, as exemplified by derangement of the circulation or respiration, or of alterations in sensation. In one case I have observed complete anæsthesia of the mucous membrane of the bladder, and the patient was unable to micturate spontaneously for several weeks. These remote reflex symptoms are regarded and designated by some observers as "purely hysterical," a term the exact import of which has not, as far as I am aware, been defined. It is one commonly used to imply an attempt to counterfeit disease on the part of the patient. Does it not really, in most instances, serve as a convenient cloak for the ignorance of its creator when he is confronted with numerous and perplexing symptoms of the intimate pathology of which he has little knowledge?

These remote reflex symptoms of movable kidney may be seen in patients who have very perfect mental control, and in whose case the suggestion of either partial or complete suspension of inhibitory mental influence at any time could not be entertained. But while this is true in some cases, in many others the patients are distinctly devoid of self-control and given to exaggerate their suffering, and sometimes even to mimic diseased conditions. It is therefore extremely difficult for the surgeon, unless he makes a very careful study of the individual case, to say how far the reflex phenomena are actual or assumed, but to conclude that in all instances they are the result of morbid mental conditions is very apt to lead one into serious error.

CASE 7. *Movable right kidney, with onset of symptoms characterised by marked respiratory and digestive disturbance; local symptoms at first trivial.*—The patient I saw at Uppingham, with her family physician, and he told me that when he was asked to see her in October, 1902, the first symptoms were those of acute gastro-intestinal disturbance. On making an abdominal examination he found the right kidney freely movable, but the patient did not complain of pain in the renal region, and the urine was found to be strictly normal. Mr. H. Lyon Smith regarded the case as one in which the gastro-intestinal disturbance was due to the displacement of the right kidney. He ordered rest and the application of an abdominal bandage and kidney air-pad, with the result that she enjoyed good health till May, 1904. He noticed that the symptoms were present only while, or immediately after, the kidney was displaced; and he maintained, and in this I agree with him, that there was no "hysterical" element in the case.

The patient was an extremely quiet, sensible woman. Mr. Lyon Smith wrote to me, saying:—"In May of this year I was called hurriedly to see her, on account of a 'suffocative attack.' I found her walking about the room very flushed and anxious-looking, breathing very quickly, about 80 shallow inspirations per minute; pulse very small and thready, 110 per minute. The attack resembled one of angina, except that the face was flushed rather than pale."

The heart and lungs were free from any organic disease. During June and July, while the patient was permitted to move about, and the kidneys occasionally became displaced, these attacks were frequent; but with complete rest they soon disappeared, and with medicinal treatment her general health improved. The conclusion Mr. Lyon Smith came to was that "the suffocative attacks were caused by the movements of the right kidney setting up a sudden disturbance of the sympathetic nervous system," and when the kidney was kept at rest the attacks ceased.

The patient came to Glasgow and I had her under observation for over three weeks, and from what I saw I am convinced that Mr. Lyon Smith's explanation is correct. We are very familiar with gastro-intestinal symptoms as a result of movable kidney, but marked respiratory disturbance is uncommon. I have seen a few instances similar to, but much less marked than, the one just described, but in most of them the patients were easily excited, and in many, if not in all, I was unwilling to admit the possibility of reflex irritation. In this case I think we have clear examples of reflex functional disturbance directly resulting from the displacement of the kidney.

(*b*) *Passive congestion* as seen in chronic cardiac and pulmonary diseases or from pressure on the main veins does not cause pain, but there is a dull, aching feeling in both the lumbar regions, which is usually worst at night, is not eased by fixation, and is aggravated by firm deep pressure. On the other hand, in lumbago the pain is more severe in the morning, becomes easier as the day advances, is relieved by fixation, and is as a rule more marked on one side. In passive congestion the urine is diminished in quantity and contains albumin, and sometimes blood-casts. The effects of passive hyperæmia have already been described under movable kidney.

(*c*) *Inflammation, acute and chronic.*—In septic nephritis and other acute infective diseases pain may be a marked symptom, and the amount of suffering depends upon the degree of tension of the capsule. In acute nephritis the pain is dull and aching and there is tenderness on pressure both in front and behind and even to percussion. It is never paroxysmal and never referred. The pain is not limited to one side, but extends across the back, as generally both kidneys are involved. When it ceases to be limited to the lumbar region a general toxæmia is indicated and an unfavourable result may be expected.

The points to attend to in the diagnosis are: 1. The situation and character of the pain. 2. Presence of blood corpuscles, albumin, and tube casts in the urine. 3. General constitutional disturbance, loss of appetite, nausea, and vomiting, fever, high pulse and dry skin, œdema. 4. Scanty, cloudy urine.

(*d*) In *hydronephrosis*, as a rule, severe pain is only induced when the obstruction of the ureter is sudden and complete or nearly so, or as a consequence of pressure of the distended kidney on the neighbouring structures. In the majority of cases of chronic hydronephrosis recorded the patient suffers more from a sense of weight and dragging than actual pain. Intermittent hydronephrosis as seen in movable kidney has already been referred to, but it is also a result of temporary obstruction in the pelvis or the ureter from lodgment of calculus, blood clot or fragments of tumour. In these cases the pain assumes the characters of renal colic, and it is often very severe and widely distributed. Hydronephrosis is frequently associated with other painful affections, such as cancer of the uterus or bladder, prolapse of pelvic organs, or impacted calculus, and an amount of suffering may be attributed to the distension of the renal pelvis for which it should not be blamed.

The amount of pain does not, however, depend upon the size of the hydronephrosis, but rather upon the circumstance whether the obstruction leading to it is acute or chronic in its nature.

Sudden pain coming on in a case of chronic hydronephrosis, in which the patient has been free from suffering for a considerable time, and especially if the onset of the pain is preceded by a strain, blow, or other injury, should suggest rupture of the hydronephrotic sac into the peritoneal cavity. In such circumstances the pain assumes the characters of that of peritonitis—sudden sharp pains with marked rigidity of the abdominal walls, with general tenderness; rapid pulse becoming thready; temperature subnormal or febrile.

The points to attend to in diagnosis are: 1. Distinct swelling in the lumbar region coincident with diminution or suppression of urine, and the sudden relief of pain being associated with the passage of a large quantity of urine of low specific gravity. This may be followed by some hæmaturia. 2. Chronic dragging pain in the back with occasional exacerbations. 3. Injections of collargol into the renal pelvis demonstrate the extent of the distension when viewed with the X rays.

(*e*) In *pyelitis and pyonephrosis* pain, except of a dull, dragging kind, may remain absent for a considerable time. Severe pain may be experienced without any distension of the pelvis. The pain is of much the same character as in hydronephrosis, except that it is more marked in the kidney zones, and the tenderness on pressure over the kidney in front is more pronounced and more constant. It is associated with frequent and painful micturition, pain in the penis, and extending down the back of the thighs.

In suppurative disease of the urinary tract the effect produced by toxins may give rise to painful affections simulating lumbago, rheumatism, gallstone, renal or vesical calculus, and appendicitis, which symptoms diminish or disappear on the employment of a vaccine prepared from the organisms isolated from the urine, even although the quantity of pus and the number of organisms in the urine may not be diminished; the antitoxins evidently neutralising the effect of the toxin so that their harmful effects cease to be evident.

In suppurative diseases of the renal pelvis the absence of pain depends upon the circumstance of free escape of the excretion into the bladder. Should this be intercepted temporarily the increased intrarenal tension may cause severe paroxysms of renal colic. Pressure over the kidney may provoke much pain, and palpation by abdominal, rectal, or vaginal examination may reveal thickening of the walls of the ureter. If there is a large collection of pus in the pelvis of the kidney, and especially should the suppuration be induced by the presence of a calculus, rupture may take place into the abdomen or into the space behind the peritoneum.

The points to attend to in the diagnosis are: 1. Swelling in the lumbar region gradually increasing in size, during which time there may be little pus in the urine. 2. Pain steadily increasing, with febrile symptoms, relief of pain coincident with discharge of pus, which may be seen by the cystoscope escaping from the ureter of one kidney. If the case is a very chronic one the pus may form small casts of the ureter which lie in the bladder like a collection of maggots. These casts, of course, are destroyed when the urine is passed per urethram. Pain is usually limited to the lumbar region, and is increased on pressure, but not by movement.

(*f*) In *cystic degeneration* pain is undoubtedly rare, unless suppuration or some other complication has set in. In simple cases of polycystic kidney the patient may complain of dull aching in the renal region, sometimes of a sickening character. Usually there is only a sense of general discomfort as a consequence of the size and weight of the kidney, but there may be exacerbations resembling renal colic if the cystic kidney has become movable. These attacks are due to transitory hydronephrosis rather than the cystic degeneration. In many cases there is much tenderness on pressure. Spontaneous pain is distinctly local and is seldom severe, unless when pressure is exercised by the weight of the kidney pressing on the lumbar plexus, or by a pyonephrosis being established.

The points to attend to in diagnosis are: 1. A non-fluctuant swelling in one or both loins—rounded, nodulated on the surface; the renal form of the organ is retained; it is not painful on pressure, nor does it increase or diminish from time to time. 2. Hæmaturia may occur, but is not frequent or severe. 3. The urine is large in amount, low specific gravity, and contains some albumin, but no pus. 4. Cardiac and arterial charge may also indicate the character of the disease.

(*g*) In *perinephritis and perinephritic abscess* the pain is severe and lacerating from the beginning and increases steadily. On account of the location of the lesion the lumbar plexus becomes involved, and consequently the pain is referred to the distribution of the nerves supplied therefrom. This explains why in chronic perinephritis the pain in the thigh or knee may be mistaken for that of hip-joint disease. Areas supplied by the anterior crural, the external cutaneous, and the genito-crural are also affected. There is great tenderness on pressure, motion is controlled, and the patient is unable to bend forward or back, associated with local elevation of temperature and rigors, preceding the appearance of swelling and fluctuation in the lumbar region.

It is usually first located in the loin, but may extend along the distribution of the nerves of the lumbar plexus later, and as a rule it continues until the pus is evacuated. In chronic cases the surgeon is apt to be deceived by the absence of pain, and the patient may be deluded into the hope that a good recovery has taken place. The constitutional disturbance, however, remains, and it is only when the pus is freely evacuated that a relief from pain can be looked for.

The points to be attended to in diagnosis are: 1. A diffuse, posterior swelling not limited to the renal region, fluctuant, and associated with fixation of the lumbar spines and curvature towards the diseased side. 2. Pain in the lumbar region increased on pressure from behind, with reflex pain in the areas of the lumbar plexus. 3. Gastro-intestinal symptoms, sickness, vomiting and tympanites, febrile temperature, white blood corpuscle count increased. 4. No hæmaturia or pyuria.

(*h*) *Tuberculosis* of the kidney is not characterised by severe pain, but commonly the patient complains of a dull, dragging sensation in the loins. Pain in renal tuberculosis depends upon whether or not the pelvis and ureters are involved in the disease. When limited to the cortex the area of tenderness is most marked in the lumbar region close to the tip of the fourth lumbar transverse process. Pain is seldom severe when the parenchyma only is implicated, and rarely amounts to more than a dull, dragging sensation in the loin. Agonising suffering is sometimes endured, however, in cases of tuberculous pyelitis and when the disease involves the ureter and bladder. This is specially seen when the flow of urine is impeded by the ureter becoming obstructed by blood clot, tuberculous débris, or by induration of the walls of the duct. In such instances the pain is associated with

frequent micturition, and comes on in paroxysms like those of nephritic colic, and is often temporarily relieved by a copious flow of urine. Strangury is present in almost all varieties of the disease, but there is seldom an escape of blood with the last drops of urine unless the bladder is involved, and the pain and frequency are almost as marked when the patient is at rest in bed as while moving about. The greatest discomfort is referred to the bladder, which, when it becomes distended, causes considerable suffering before and during micturition, but the pain is relieved immediately the bladder is empty.

The points to attend to in diagnosis are: 1. Enlargement of the kidney with tenderness most marked in the lumbar region at the point of the fourth lumbar transverse process. 2. Slight hæmaturia, polyuria and pyuria, with tubercle bacilli in the urine. 3. Frequent and painful micturition with evidence of irritation of the orifice of the ureter on the diseased side and purulent urine escaping from it. 4. Tuberculin reactions positive. 5. Febrile temperature and probably evidence of tuberculosis elsewhere.

(i) The pain associated with *renal calculus* varies according to the situation and composition of the stone, and according as there is, or is not, pyelitis. It may be stated generally that when the calculus is impacted in the substance of the kidney, and uncomplicated by pyelitis, there is comparatively little suffering, or severe pain may exist for a time and then disappear for years. In other cases there is a dull pain almost constantly present in the loin. If the calculus is in the renal pelvis, or moving freely in a cavity within the kidney, pain becomes a more marked symptom, and is not limited to the loin, but extends to the testicle, to the penis, and the inner aspect of the thigh. When the stone is impacted in the ureter the action of the psoas muscle in walking may aggravate the pain.

When the calculus is so situated the pain is dependent upon movement, being aggravated by exercise of any kind, or even by movements in bed, while complete rest generally affords marked relief. The varying pressure of the abdominal viscera, or changes in posture, may modify the pain, or palpation either in the back or of the abdomen may cause it to be temporarily increased.

Immediately a stone enters the ureter renal colic sets in, and the paroxysms, coming on often without warning, may last for hours or days. The pain is agonising, and radiates from the region of the kidney down the ureters to the thigh, penis, and testicle. When the first sickness and faintness, so characteristic of renal colic, have passed off, the patient may endeavour to relieve himself by contortions in all directions, or may be thrown into convulsions by the fearful agony he is suffering. After a period of great anguish, usually measured by hours, the pain subsides as suddenly as it came on, and the other symptoms accompanying it disappear. If the calculus passes into the urinary bladder the patient may be sensible of the fact, but if the stone has merely become displaced from the renal orifice of the ureter another paroxysm may occur at any time. In other cases the calculus remains impacted in the ureter, which becomes more or less habituated to its presence. Under such circumstances, although the pain may set in suddenly, it becomes only gradually relieved, and cessation of suffering alternates with paroxysmal attacks, probably caused by spasm of the ureters.

In renal calculus the pain is not entirely due to the direct irritation of the stone or to the obstruction produced by its impaction. Another factor must be admitted. The presence of the calculus in most instances induces a congested condition of the renal parenchyma, and this increased vascular tension is of itself the cause of much suffering. The fact is well illustrated by the relief experienced by patients after a free hæmaturia or by a cupping in the lumbar region.

CASE 8. *History of renal calculus for 20 years; repeated attacks of renal colic, and passage of stones and gravel from both kidneys; frequent hæmaturia and occasional pyuria; pain often relieved and general condition improved by a profuse hæmaturia; nephrolithotomy.*—The patient was admitted to the "Central Home" on account of an acute attack of calculous pyonephrosis in the left kidney. He gave me a long and interesting history of his illness, which commenced over 20 years ago. During that long period he had many attacks of renal colic, and not infrequently they were associated with the appearance of pus or blood in the urine. He took a very intelligent interest in his illness, had studied his own case carefully, and observed that when the pain came on, preceded by the usual premonitory symptoms of an attack, which he readily recognised, if he took a long ride on horseback until he was exhausted, a profuse hæmaturia was induced, unaccompanied by the passage of stone or gravel. This gave him much relief from the pain, and for several weeks thereafter his general health improved. A stone weighing half an ounce, and of the form and size of an index finger, was removed, and the patient made a good recovery.

It must be borne in mind that renal colic may arise from any sudden stoppage of the ureter, by disease of its walls, by a foreign body, by pressure from without, or by torsion. Hence, we find that although renal calculus is the most frequent cause of severe paroxysmal pain, this symptom may likewise occur in tuberculous disease from the passage of a caseous mass or a plug of mucus, or as a consequence of a tuberculous ulcer. In hydatid disease severe suffering may arise from the evacuation of cysts, or in tumours of the kidney from portions of the growth becoming detached and carried down the ureter.

As shown by Prout—and Dickinson agrees in his opinion—the pain is not equally severe in all varieties of renal calculus. The latter says "that of renal concretions lithic acid produces the least pain, what there is being dull, oppressive, and connected with a sense of weight; oxalate of lime causes pain of a more acute kind, and that often referred to a particular spot over the region of the kidney, and sometimes discursive, shooting in the direction of the ureter, epigastrium, or shoulder." Calculi composed of phosphates are "found to be attended by great suffering—almost unremitting, though paroxysmally aggravated."

Pain such as described must be regarded as one of the most important indications of renal calculus, and may of itself, if sufficiently characteristic and aggravated, justify the surgeon in making an exploratory incision even in the absence of other symptoms.

The points to attend to in diagnosis are: 1. The diagnosis of renal calculus has been made easy and certain by radiography. It is the short cut to diagnosis, but should not be allowed to supersede all other methods, only used along with them. 2. Pain is generally associated with hæmaturia and often with pyuria. 3. Pain is increased by manipulation and by exercise, and is relieved by rest. 4. The ureter orifice on the affected side is abnormal and the urinary shoots increased in number. 5. Reflex symptoms are common during attack of colic, and urine may be suppressed from one or both kidneys.

(To be concluded.)

A SIMPLE PERCENTAGE CHLOROFORM INHALER.

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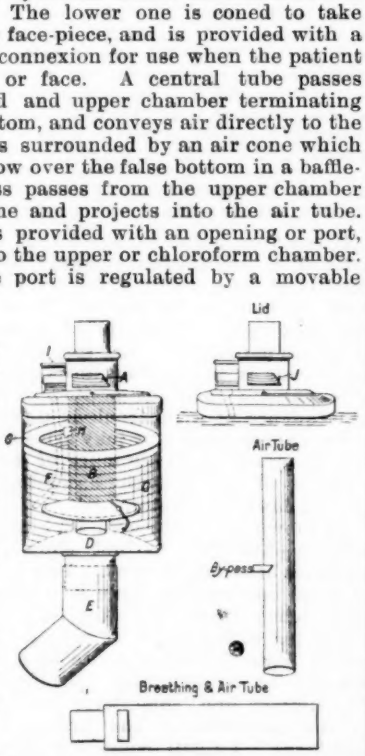
THE principle of this inhaler was originally brought out in Paris, and introduced in a modified form to English clinical medicine by Professor A. D. Waller. As a result of working with an inhaler lent to me by Professor Waller, this apparatus has been devised chiefly because it permits greater ease of application to the patient's face, irrespective of the patient's position, and a freer air-way. As the illustration shows, the apparatus consists of a metal cylinder divided by a thin domed false bottom into two chambers. The lower one is coned to take an ordinary gas face-piece, and is provided with a movable angle connexion for use when the patient is on his side or face. A central tube passes through the lid and upper chamber terminating in the false bottom, and conveys air directly to the face-piece. It is surrounded by an air cone which is expanded below over the false bottom in a baffle-plate. A by-pass passes from the upper chamber through the cone and projects into the air tube. The air cone is provided with an opening or port, admitting air to the upper or chloroform chamber. The size of the port is regulated by a movable



The percentage chloroform inhaler and its component parts:

A, Port or air inlet closed.
B, Absorbent wick for chloroform around central cone.
C, Absorbent wick around walls of chamber.
D, Hollow dome.
E, Detachable tubing for fixing to respirator.
F, Chloroform tube.
G, Baffle-plate.
H, Chloroform by-pass to air chamber.
I, Inlet for chloroform.
J, Port opening left to right.

collar on the lid, and an indicator shows the percentage of chloroform which is passing to the face-piece. The upper chamber is surrounded inside with wick, and also has wick round the inner cone. Both wicks touch the bottom of the upper chamber, the latter one by passing through a hole in the baffle-plate. The lid is removable, but to save taking it off during the administration of the anæsthetic a screw-on cap in the lid permits the addition of chloroform to the upper chamber. The wicks can be removed, and the whole apparatus can then be sterilised.

To use the inhaler 6 drachms of chloroform are placed in the upper chamber, which saturates both wicks and leaves a layer on the false bottom, below the baffle-plate but not touching the latter. The port is closed. An ordinary gas face-piece is attached to the coned end, either directly if the patient is on his back, or if in another position by means of the detachable angle-piece. The face-piece is then adjusted to the patient's face, so that the only admission of air is by the air-tube. Pure air is then breathed. As the port is opened chloroform vapour is drawn through the by-pass in the same way as air is sucked in a Bunsen burner or Fletcher gas stove. The expirations of the patient maintain a constant temperature in the chloroform chamber, and from actual experiments at that temperature the dial on the lid is graduated to show the percentage being inhaled. In use it is found advisable to start with the port closed, indicator at zero, and to take 10 minutes in passing gradually to 2·5 per cent. when surgical anæsthesia is generally produced. A higher percentage is rarely needed. Anæsthesia when obtained can be maintained at from 1 to 2 per cent. The only important point is to make a gas-tight joint between the face and inhaler, which can always be obtained by the use of an appropriate sized face-piece.

I have used this apparatus in more than 1000 cases, some of over two hours' duration, and have found it most efficacious. The advantages claimed are the ease of adaptation to the patient's face, irrespective of his position, the perfect air-way, and the certainty of the percentage of chloroform, as well as the simplicity of the inhaler, which is without valves or parts that can get out of order. Experiments made by drawing air by aspiration from the chloroform chamber have not revealed any increase of carbon dioxide, thus showing the absence of rebreathing.

The apparatus can be obtained from Mr. Cliff, motor engineer, of Well Hall, Kent.

I wish, in conclusion, to express my indebtedness to Professor Waller, who has kindly verified the chloroform percentages on his chloroform balance.

Kensington Palace Mansions, W.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF ECLAMPSIA WITH TRIPLETS, TWO OF THE CHILDREN BEING UNITED.

BY ROBERT JARDINE, M.D. EDIN., &C.,
PROFESSOR OF MIDWIFERY, ST. MUNGO'S COLLEGE; PHYSICIAN AND GYNÆCOLOGIST, GLASGOW ROYAL MATERNITY AND WOMEN'S HOSPITAL.

THE following case of eclampsia is an interesting one, as it was one of triplets with two of the children united. With triplets the risk of eclampsia is very much greater than with single pregnancies, as the strain upon the mother's system is enormously increased.

Mrs. ——, primigravida, aged 23, was admitted to the Glasgow Royal Maternity and Women's Hospital on Dec. 5th, 1915, suffering from eclampsia; there had been five severe fits. On admission she was very obstreperous and was with difficulty kept in bed. She complained of violent headache and failing sight, but was not quite blind. There was great œdema of the face, body, and legs. The abdomen was very much distended, and on palpation it was impossible to make out any fœtal parts, neither could the fœtal heart be heard. The case was looked upon as one of multiple pregnancy. The urine was heavily loaded with albumin. The os uteri admitted two fingers and the cervix was taken up. Labour had commenced. There was a head well engaged in the pelvis. She was supposed to be eight months pregnant.

The patient was given a saline transfusion of 2 pints (3 i. each of sod. chlor. and sod. acet. to the pint) under the breasts, a large dose of Epsom salts by the mouth, and 0·5 c.c. trivalin hypodermically. A fit occurred after the transfusion, but there were no more. She soon became quiet and the labour passed off. On the 6th the sight was

normal and the headache had ceased. The bowels had been well cleared out and the kidneys were acting well. There were no labour pains.

On the 7th labour came on again, and at 6 P.M. the membranes ruptured spontaneously. As the head did not advance it was decided at 8 P.M. to deliver with forceps. The instruments were applied by Dr. Grace Whish and the head was easily delivered, but when the body came down there was difficulty with the breech. Another breech was discovered to be coming and the two were attached. The two children were got away by making strong traction upon the first one; the perineum was torn. Another child was found to be in the uterus in an unruptured sac. The membranes were ruptured and a live male child was delivered with forceps.

The uterus remained very flabby and a severe post-partum hæmorrhage came on. The two placentæ were removed, and as the uterus did not retract under the stimulus of kneading and a hot douche, it was quickly packed tightly with iodoform gauze. Hypodermic injections of ergotin and pituitrin were given and a saline transfusion of two pints. The pulse, which was very feeble, soon began to improve and by next morning was fairly good, about 108. She had passed a large amount of urine and the albumin had lessened. When the packing was removed the uterus was very firmly retracted, and there was no bleeding. Considering what the patient had come through she was very well, and the prognosis looked hopeful, but next morning she began to complain of severe pain at the base of her right lung, and her breathing became very embarrassed. It was evident that pneumonia was setting in. Hot antiphlogistine applications somewhat relieved the pain, but the breathing became more embarrassed and the pulse began to fail. Death occurred at noon, 40 hours after delivery.

The united children (females) were alive and apparently strong. They weighed 6 pounds. As they lay covered in a cot buttock to buttock they looked like two normal small children. Urine was passed, but no meconium. Small quantities of milk were taken quite readily. They did not seem to suffer much, but gradually lost flesh, dying on the 13th at 6.10 A.M. The single child, a male weighing 6 pounds, was a fine sturdy little fellow, and was thriving well a few days later when taken home.

The placentæ weighed 1¼ lb. each. The cord of the single child was 20 inches long. The united cord, which was only about 3 inches long, had been torn off at the placenta. The shortness of the cord had prevented the descent of the head.

Photograph of the twins showing the two connecting stalks (S), the central mass (M), the severed edge of the fused amnions (A), and the talipes (T). The insertion of the umbilical cord was on the opposite side of the mass from M.

I am indebted to Dr. J. F. Gemmill, lecturer in embryology, Glasgow University, for the photograph here reproduced, and for the following note:—

"Dr. Jardine's specimen is of very great interest for the reason that it appears to be the only well-authenticated instance among mammals of twins with ventral union limited, as far as the parietes are concerned, to the umbilical region. With a single doubtful exception dating back to the fourteenth century, all other recorded examples of ventral or "Siamese twin" union exhibit fusion to a greater or less extent, either in the thoracic (thoracopagus) or in the pelvic (ischiopagus) regions. The sub-type omphalopagus must accordingly be recognised in the future classifications of mammalian double monstrosities, its position being intermediate between the two sub-types just named. A detailed account of the specimen is being prepared by one of my students, Mr. James Stewart, and myself."

Glasgow.

A CASE OF FULL-TERM EXTRA-UTERINE PREGNANCY; OPERATION.

BY J. F. DEVANE, M.D. N.U.I., F.R.C.S. IREL.,
HONORARY SURGEON, LIMERICK COUNTY INFIRMARY, AND ST. JOHN'S HOSPITAL, LIMERICK.

FULL-TERM extra-uterine pregnancy is a rare condition, and the following notes on a case may be of interest.

The patient, aged 38, was married seven years ago. Three months later she had a miscarriage, was curetted, and a year afterwards a child was born. In February, 1913, she had a second miscarriage. Menstruation was then regular until May, 1914, when it ceased, but returned again in July; from then until December she was unwell every two or three weeks, and suffered from slight abdominal pains and general discomfort. In December menstruation stopped and did not return for five months—i.e., until April, 1915, a week before admission to hospital. At that time she had a "flooding" and bearing-down pains. A midwife attended her and told her she had had a miscarriage—that "the little birth had come away," but that she had a large tumour for which she would require hospital treatment. On examination the uterus was found enlarged, reaching two inches above the umbilicus; the os was patulous and admitted the index finger; there was a blood-stained discharge from the vagina. Behind the uterus a large cystic tumour was felt filling up the pelvis and occupying most of the abdomen. Lactate of calcium was administered for a few days. The abdomen was opened by a long median incision. The uterus was first sought for and found above the pubes, in contact with the anterior abdominal wall. Behind the uterus a large cystic tumour was found filling up the pelvis below and reaching almost the diaphragm above. Coils of small intestine were adherent to its anterior and upper surfaces. The adhesions were sponged off, or ligatured and divided, and the tumour was brought partly into the wound and packed round with sponges. A large trocar was introduced and several pints of dark-coloured fluid were withdrawn. The sac was then slit up freely and a well-developed full-term male child was found lying in the left occipito-anterior position. The cord was divided and a stillborn child extracted. A large placenta was found adherent to the floor of the pelvis and stretching up along the back of the uterus. This was sawn off with the finger-tips. Considerable hæmorrhage occurred from some of the vessels near the centre of the placental site, where thrombosis had not completely taken place. This was dealt with by forceps, and hot sponge pressure, and a saline infusion was given into each axilla. The superfluous portion of the sac was removed, and remaining pelvic part was plicated by means of a couple of rows of purse-string suture passed around its inner surface; thus the large pelvic space was converted into a cylindrical tube. This was sutured to the lower angle of the abdominal wound and a drainage-tube passed into it. The drain was removed on the third day; a slight seropurulent discharge persisted for a fortnight from the gestation sac. The remainder of the abdominal wound healed by first intention.

The condition might easily have been mistaken for a five months' miscarriage, associated with a large ovarian or intraligamentous cyst. The duration of the amenorrhœa corresponding with the size of the uterus, the signs of recent delivery, and the nurse's statement pointed to a miscarriage; the gestation tumour resembled a large cyst—there were no fœtal movements, no fœtal heart, the excessive amount of liquor amnii and the adherent intestine rendered difficult the palpation of the fœtal parts, whilst the large placenta spread out behind the uterus masked the fœtal head.

A report of the patient on Feb. 14th, 1916, states: "Menstruation returned three months after the operation and lasted eight days. She has been unwell about every three weeks since then, and at the present time she is feeling quite strong and healthy."

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OPHTHALMOLOGY.

Discussion on Disturbances of Vision from Cerebral Lesions, with Special Reference to the Cortical Representation of the Macula.

A MEETING of this section was held on March 22nd, Sir ANDERSON CRITCHETT, Bart., C.V.O., being in the chair.

Colonel W. T. LISTER, C.M.G., A.M.S., and Lieutenant-Colonel GORDON HOLMES, R.A.M.C., read an introductory paper upon the subject to be discussed. They stated that in their work at the base hospitals in France during the past 18 months they had observed a very large number of cases in which the vision was affected by lesions of various portions of the optic system. By selecting for thorough examination a certain number of suitable cases, a group of facts had been collected which had an important bearing on the cerebral localisation of vision, more particularly on the representation in the cortex of different regions of the retina. It might be objected, they said, that as the observations were necessarily made at an early stage after the infliction of the injury some of the effects observed might have been due to functional disturbances rather than to local injuries of the corresponding cortical areas or their centripetal fibres. But if it could be shown that there was a constant relation between the probable site of the injury and the form of the visual defect, certain general conclusions would be at least justifiable. The injuries in the cases referred to included penetrating wounds of the cranium by rifle bullets, shell fragments, and shrapnel, as well as local concussion and depressed fractures. The probable positions of the cerebral injuries were determined by careful measurement of the entrance and exit wounds from fixed points, such as the external occipital protuberance, the relation of which to the calcarine fissure and optic radiations being known, by means of radiographic examination, and by observations made at the time of operation, &c. The notes of 21 cases were recorded. The first group contained instances of quadrantic hemianopia, and from these it was concluded that the upper half of each retina is represented in the upper part of the visual area, and *vice versa*. In the second group several cases of absolute or partial central scotoma were described; in all these the lesion was probably limited more or less completely to the posterior extremities of both occipital lobes. Consequently it appeared probable that the centre for direct macular vision lay in the posterior part of the visual area. This conclusion was supported by the fact that among over 2000 cases of head injuries they never saw a central scotoma where a direct injury of the occipital poles could be excluded. Further, they described cases of homonymous hemianopia with loss of central vision in the opposite halves of the visual field in cases where the optic radiations or the visual centres had been destroyed on the one side, while the lesion was limited to the occipital pole of the other hemisphere. The above conclusion was also supported by another large group of cases—viz., those with paracentral scotomata. In each of these cases the lesion involved only the posterior part of the visual area, and it was found that when the upper portion of the posterior part of the calcarine cortex was injured, the paracentral scotoma involved central vision immediately below the fixation point in the opposite halves of the visual field, and *vice versa*. It was consequently probable that the upper part of the macula lutea and the surrounding retina were also represented in the upper part of the visual area, and *vice versa*. They believed that the hypothesis of bilateral representation of the macula was unnecessary and incorrect on the following grounds—viz., that the above-mentioned paracentral scotomata usually extended right up to the fixation point, and also that in the hemianopia produced by penetrating wounds which involved one occipital lobe, there was not usually the "macular escape," such as was so frequently seen in the hemianopia due to vascular lesions. They suggested that this "macular escape" was probably due to the fact that the tip of the occipital lobe, in which central vision was represented, was a watershed area, which might draw its blood supply from either the middle or the posterior cerebral arteries; the variation in the respective distribution of these arteries, they believed, might account for the escape or the involvement of vision in the neighbourhood of the fixation point. The interesting question was raised as to whether vision for colours might be dissociated from that for white—in other words, whether an achromatopsia could be produced by cerebral lesions. They considered, however, that they had gleaned no conclusive evidence that achromatopsia, with intact vision for white, was produced by cerebral lesions which involved either the cortex or the optic radiations. The authors' conclusions, which they did not yet regard as final, were formulated as follows: 1. The upper half of each retina is represented in the dorsal, and the lower in the ventral part of each visual area. 2. The centre for macular or central vision lies in the posterior extremities of the visual areas, probably on the margins and lateral surfaces of the occipital lobes. 3. That portion of each upper quadrant of the retina in the immediate neighbourhood of, and including the adjacent part of the fovea centralis, is represented in the upper and posterior part of the visual area in the opposite hemisphere, and *vice versa*. 4. The centre of vision for the periphery of the retinæ is probably situated in the anterior end of the visual areas, and the serial concentric zones of the retina from the macula to the periphery are probably represented in this order from behind forwards in the visual area. The paper concluded with a grateful acknowledgment of the assistance received by the authors from the medical officers of the various hospitals in which the cases were observed, and their thanks to Captain Curtis Webb for help in the preparation of the illustrations.

Sir ANDERSON CRITCHETT, in expressing the gratitude of the section to the authors for their painstaking research, referred to the rapid strides made by brain surgery, and the unexampled opportunities afforded by the present conflict to make advances in surgical and medical knowledge.

Lieutenant-Colonel R. H. ELLIOTT asked whether Colonel Lister and Colonel Holmes were able to confirm the estimate as to the efficacy of the steel helmet in preventing head injuries. He also referred to the greater severity of wounds inflicted by bullets which struck in the first 250 yards of their flight, before they had settled down to a steady onward course, as compared with those which found their billet at distances between 250 and 1000 yards.

Captain A. W. ORMOND suggested a possible confirmation of the authors' thesis in the central scotoma met with in some people who were subject to megrinous attacks. It was probably a vascular phenomenon, dependent upon the macular centre being placed at the posterior pole of the occipital lobe.

Mr. LESLIE PATON urged ophthalmologists in this country who received cases from France after the shock and the acute symptoms had subsided, to exercise great care in the taking of the fields of vision and the construction of perimeter charts (though not with the McHardy perimeter), and follow the cases up as far as possible, keeping a record of their sequelæ, and in that way assist in making the investigations of Colonel Lister and Colonel Holmes of abiding value.

Colonel HOLMES briefly replied, remarking that as the steel helmets had only recently been issued to the British Army it was as yet too soon for conclusions to be drawn.

SECTION OF DERMATOLOGY.

Exhibition of Cases, Specimens, &c.

A MEETING of this section was held on March 16th, Dr. J. H. STOWERS, the President, being in the chair.

The PRESIDENT paid a warm tribute to Professor James Clarke White, whose death had deprived dermatology of one of its leaders. The deceased was professor of dermatology at Boston.

The following cases were shown:—

Dr. J. M. H. MACLEOD: A case for diagnosis. The patient, a woman aged 48, had a condition of Bilateral Facial Hemiatrophy. Eight years ago she had an eruption which was diagnosed as lupus erythematosus. The lesions disappeared quickly under treatment, but as each fresh lesion appeared and vanished it left an atrophic patch behind it.—Dr. W. KNOWSLEY SIBLEY considered that it was a case of sclerodermia, which had followed the cutaneous eruption.—Dr. F. PARKES WEBER thought it was an ordinary case

of bilateral facial hemiatrophy, possibly caused by the previous eruption, with which the PRESIDENT agreed.—Dr. S. E. DORE stated that he had had a similar case of atrophy which had followed lupus erythematosus.

Dr. G. PERNET: 1. A case of Staphylococcia in a girl with Xerodermia (staphylococcia *en nappe et en foyers à progression excentrique*).—Dr. DORE and Dr. H. G. ADAMSON considered it to be an ordinary case of infantile eczema.—Dr. PERNET objected to the diagnosis of eczema, as the lesions began as pustules, on a xerodermic skin, and not until the child was two years old.——2. Chancre on the lower lip.

Dr. E. G. GRAHAM LITTLE: Diffuse Papillomatosis (?) Acanthosis Nigricans. A woman, aged 52, had first of all some ulceration of the left leg, which was followed by an elephantiasic condition, with marked verrucose lesions around the ankle-joint.—Most of the members thought the condition was either of septic, syphilitic, or tuberculous origin.

Dr. MACLEOD: A painting of a very similar condition, which followed a septic ulcer.

Dr. A. EDDOWES: Acute Lupus Erythematosus with Nodular Necrotic Tuberculides of the Extremities. The patient was a woman, aged 27, with marked lupus erythematosus of the face and papules on the arms and legs.—The section considered it to be a case of acute lupus erythematosus in which the prognosis was bad. It was the general impression that those cases ended fatally from a pneumococcic infection.

Dr. H. SPENCE (introduced by Mr. J. E. R. MCDONAGH): A Recurrent Syphilide simulating a Reinfection. The patient had a papulo-necrotic chancre in June, 1915, which was followed by neither inguinal adenitis nor by a rash. The sore healed up under four injections of "606." In January, 1916, another sore appeared on the penis which bore an exact resemblance to the original sore. There was also a lesion on the tongue, which simulated a primary sore. The other lesions were different in character.—Captain C. H. MILLS and Dr. PERNET thought the lesions on the penis and tongue were gummata.—Mr. MCDONAGH, who had seen the case originally, said he could not distinguish between the two sores on the penis and that the lesion on the tongue simulated a chancre.

Dr. J. L. BUNCH: Acute Sclerodermia with Sclerodactylia. The case was exhibited with the idea of eliciting the opinion of the section as to the advisability of treating the case by thyroid implantation. Implantation was only advised provided the patient showed an idiosyncrasy to small doses of thyroid. Its effect was considered to be temporary only.

Dr. ADAMSON: Microscopic slides of a unique case of Sweat Gland Tumour.

Dr. GRAHAM LITTLE also showed slides of the case he exhibited and of a tumour which had been removed from the vulva.

SECTION OF ELECTRO-THERAPEUTICS.

Experiments and Experiences with the Coolidge Tube.

AT the meeting held on March 17th under the presidency of Dr. W. IRONSIDE BRUCE, the section discussed Experiments and Experiences with the Coolidge Tube.

Dr. R. KNOX opened the discussion. He said that the Coolidge tube possessed, among other advantages over ordinary X ray tubes, the quality of extreme adaptability; it could be used continuously over long periods without risk of damage to the tube, with currents of any strength likely to be required for examinations. Four or five milliampères could be passed through it continuously for many years. Care must, however, be taken to protect both radiologist and patient, and sittings should be of as short a duration as possible. This tube was an instrument of precision in advance of anything of its kind yet produced. It could easily be adjusted for use in various parts of the body, and could be so arranged as to give off rays of varying penetrative power. For single-flash exposures it constituted the ideal tube. He had been carrying out a series of experiments, so far of an elementary character, with the object of ascertaining the best working conditions for the tube in radiography and radioscopy. The tube was altered from "soft" to considerable "hardness" in a few seconds. He hoped it would soon be possible to standardise radiographic exposures, and to make some advances in the measurement of X ray dosage. The chief merits of the tube were seen in therapeutic work; indeed, it would be difficult to conceive of any improvements likely to render it more efficient. Within reasonable safety limits, it could be used for many hours daily, and at the end of the day would continue its output of uniform radiations. One such tube used at the Cancer Hospital was worn out after 800 exposures; it was then repaired and still remained in use. The others used there had maintained their efficiency all through. Dr. Knox gave a full description of his investigations. The researches included both screened and unscreened rays, and their penetrating power into 4-inch thicknesses of beef. The tube made it possible to attack a deep-seated growth from all aspects, and thus as searching a treatment by X rays was possible as was obtained by embedding radium. The advent of this tube, said Dr. Knox, had opened up many interesting fields for experimental research, and he hoped that doctors would combine in an endeavour to standardise X ray exposures in therapeutic doses, a hope which the new tube seemed to justify.

Sir JAMES MACKENZIE DAVIDSON exhibited some interesting pin-hole radiograms, and showed from experiments the great need of the radiographer protecting himself when using the tube, as the rays were emitted from the back as well as the front.

Dr. G. HARRISON ORTON said he had used the Coolidge tube 14 months for deep therapy, and he did not think anybody who had employed it would revert to the ordinary X ray tube. It saved an enormous amount of time, and without forcing matters or overheating it was possible to turn a pastille in two minutes. The tube could always be adjusted to any required penetration, hence an exact repetition of a dose could be given. He found it particularly good for epilation, and by giving two separate 10*x* doses, with an interval between, dermatitis was avoided. In starting with a new Coolidge tube only about a 4·4 ampère current should be used until the anti-cathode became properly hot; otherwise there was apt to be sparking outside, and the tube was not absolutely constant until then. When in working order the tube required no cooling mechanism.

Dr. N. S. FINZI spoke of his clinical experiences with the tube. He was not sure that the tube yielded the best results in delicate detailed radioscopy, as compared with the ordinary tungsten target. For bismuth-meal radioscopy the Coolidge tube was ideal. For radio-therapy with the Coolidge he had been trying to get the exposure down to the shortest efficiency period. He had been able to epilate a whole scalp in five areas well within half an hour. Each exposure varied from 48 to 54 seconds. He agreed with Dr. Harrison Orton that no one who had used the Coolidge tube would care to go back to the ordinary tube. He preferred the Wehnelt brake to the mercury brake.

Dr. C. W. S. SABERTON spoke of a daily experience with the Coolidge tube for eight or nine months. He had not obtained such good negatives with this tube as with the ordinary X ray tube, but the type of rays emanated was uniform in the case of the former. In tinea cases his experience was not the same as Dr. Harrison Orton's; he required a larger dose to produce epilation. He advocated the measurement of dosage of X rays after filtration.

Dr. S. RUSS remarked that Professor Rutherford and his colleagues found they could not produce X rays of such short wave-length as the gamma rays of radium, the ratio being as 1·7 to 0·7. The difference in the radiographic results from ordinary tubes as compared with those of the Coolidge tube noticed by Dr. Finzi was probably due to the fact that the radiations came in one case from the whole stem of the anti-cathode. He felt that radiographers and physicists owed a great debt of gratitude to Mr. Coolidge for his invention, which he regarded as the most wonderful X ray tube which had ever been constructed, and that much more would be revealed by it in future.

Dr. KNOX briefly replied.

THE CHILD STUDY SOCIETY.—At a meeting of this society on March 16th Dr. Ernest Jones, discussing the Unconscious Mental Life of the Child, said three critical questions arose in such a study: (1) The extent of the justification in transferring the conclusions based on the abnormal to the normal; (2) the value of the examination of the adult mind as a basis for the study of the mind of the child; (3) the extent of the reliance on the psycho-analytic method of research. The last of these he did not deal with. In reference to the first question, the differences between the working of a normal and of a neurotic mind were only those of degree; disease added no new element, though the grouping of forces might be altered and the relative perspective

modified. On the second question, he said the saying "The child is father to the man" was taken seriously by the psycho-analyst. The unchanged form of the infantile mind was buried in the depth of the unconscious, constituting its characteristic. In the psycho-analytic sense the expression "unconscious" meant processes without the conscious *ego* but dynamically active in the production of external manifestations; those of high significance to the personality, and endowed with certain attributes, sharply distinguishing them from the familiar type of mental function. Many of the child's thoughts could not be communicated because he was unable even to formulate them. From the beginning the child was protected from painful stimuli by the immediate gratification of his wants. There were two clearly marked stages in mental development—the illusory and the actual—and these were always at work. The control of the primary system of thought by the secondary remained imperfect throughout life. In reference to the question of sexuality in children there existed a strong tendency to artificially restrict the conception of sexuality. It was ridiculous to suppose the sexual life to be non-existent until it took definite form at puberty; its earlier manifestations were tentative and preparatory. Later there came a process of refinement and the elimination of discarded elements. The unconscious was naturally unmoral, because it dated from a period preceding knowledge of good and evil, and had remained impervious to such knowledge. All that could be done was to modify the manifestations of the unconscious when they merged into the conscious. Much harm could be avoided by putting into practice some of the elementary principles of medical psychology; there was too much repression of tendencies, rather than a seeking to utilise those energies and tendencies for useful social purposes.

Reviews and Notices of Books.

Water Purification Plants and their Operation. By MILTON F. STEIN, Assoc.Mem.Am.Soc.C.E. New York: John Wiley and Sons; London: Chapman and Hall, Limited. 1915. Pp. 258. Price 10*s.* 6*d.* net.

THE author deals with the subject of water-supply from three points of view—that of the engineer, the chemist, and the bacteriologist. It is rare to find amongst water engineers the three qualifications, and such a combination of knowledge must be of great service to its owner and his employers. We may instance the advantage to a water engineer of being able to conduct bacteriological tests upon the spot. In his chapter upon this subject Mr. Stein points out that the making of bacterial tests requires considerable time, and for this reason it is often customary in small plants to send weekly or bi-weekly samples to some reliable testing laboratory for bacterial counts and coli determinations. He does not, however, recommend this plan, since it does not afford a continuous record of the bacterial efficiency of the filters, and between samplings the output may be high in bacteria for several days without the knowledge of the operator. Similarly valuable is it for the water engineer not only to be able to make chemical and physical examinations but to understand the significance of the results, and in this connexion Mr. Stein deals with many important questions in a manner which should be clear even to the non-technical reader. The chapters on types of purification plants, on filtration, coagulation, and sterilisation, evidence an intimate acquaintance with purifying methods and an appreciation of the watchfulness which is required to effect and to maintain the purity of the water-supply. The book is a valuable addition to the literature of an important subject and throws an interesting light on the up-to-date methods of the water engineer.

LIBRARY TABLE.

A Text-Book of Elementary Chemistry. By ALEXANDER SMITH, B.Sc. Edin., Ph.D. Munich. London: G. Bell and Sons, Limited; New York: The Century Co. 1915. Pp. 463. Price 5*s.* net.—The treatment of the subject is upon somewhat novel lines, as the author proposes to meet the needs of those who do not later continue the study of chemistry. He suggests that in the minds of such readers an interest in chemistry is best awakened by calling attention to materials and processes used in the household and in commerce. Such a book would have a limited value if at the same time the normal student was not considered, and so the plan includes a presentation of the elements of the science in a somewhat rationalised form, the principles underlying applications being carefully explained. The author makes the curious observation that in the general study of the subject the interests of the two sexes are in part different. Thus, he regards explosives, metallurgy, and the study of mortar and cement as of interest especially to males, while plastics, starch, sugar, soaps, and the nature, preparation, and digestion of foods make, he considers, special appeal to females. We much doubt the utility or rationality of this differentiation. The book gives a clear and homely account of the elements of the subject, and a good deal of really useful ground, practical and theoretical, is covered.——The same author has written *A Laboratory Outline of Elementary Chemistry* (same publishers, pp. 152, price 2*s.* net) as a companion to the text-book. His descriptions are in simple terms and he has, as far as possible, avoided the use of complicated apparatus and of rare or expensive chemical reagents. In short, the spirit of the "Text-book" is pursued in the "Laboratory Outline," which is a good example of clear practical teaching.

Physical Chemistry for Schools. By HENRY JOHN HORSTMAN FENTON, M.A., Sc.D., F.R.S. Cambridge: At the University Press. 1916. Pp. 215. Price 3*s.* 6*d.* net.—In this acceptable little volume we have, in as simple terms as possible, the elementary principles of physical chemistry. We thoroughly approve of the author's plan to reduce mathematical expressions, when that can be done, and agree that students are often "liable to be scared away from the subject when it is presented in the more elaborate and mathematical form." And so, in accordance with this promise, we find an account of such phenomena as solution, osmotic pressure, adsorption, colloidal condition, catalysis, migration of ions, and so forth, which the reader will readily understand, provided he has some elementary knowledge of the subjects apart, i.e., chemistry and physics. We welcome this neat little compendium because of the growing importance of physical chemistry to medical science.

Food Analysis: Typical Methods and the Interpretation of Results. By A. G. WOODMAN. London and New York: McGraw-Hill Book Company (Inc.). 1915. Pp. 510. Price 12*s.* 6*d.* net.—This work will prove a useful guide to the student who requires to master the general principles involved in the analysis and examination of foods. The author has covered a fair amount of ground, and does not pretend to have exhausted the subject. He has chosen to deal with certain typical foods to illustrate, as he says, important methods or characteristic methods of food analysis. The aim of the book is to introduce general principles rather than to give counsel to the man in actual practice. Nevertheless, we have here the outlines of certain

progressive methods of analysis which will be of assistance to the consulting analyst. As examples, we may cite the chapters on the analysis of potable spirits (based largely on French and English work), on food colours and preservatives, and on cocoa and chocolate. The information is here largely based we feel sure, upon the author's laboratory experience, and that is a valuable feature of the book.

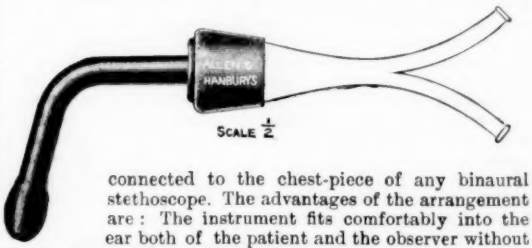
The Housing of the Working Classes Acts, 1890–1909, and the Housing Acts, 1914, Annotated and Explained together with the Rules, Regulations, Forms, and Instructions of the Local Government Board. By CHARLES E. ALLAN, M.A., LL.B., assisted by FRANCIS J. ALLAN, M.D. Edin., D.P.H. Fourth edition. London: Butterworth and Co., and Shaw and Sons. 1916. Pp. 493. Price 12*s.* 6*d.* net.—The preceding edition of this useful book has been for some time out of print. The work is so well known that a new edition requires little in the way of special commendation. Those who have to carry out the statutes and regulations brought together within its pages will find the information in convenient form, and will appreciate the care taken to avoid lengthy notes as well as all details which might render an everyday work of reference too bulky. It will be noted that Dr. F. J. Allan, an experienced medical officer of health in a metropolitan borough, assists in matters relating to practice. Such collaboration constitutes a very useful feature of the book, as for the carrying out of the Acts medical officers of health are so largely responsible. These officials, busy as they may have been before the war, are to-day likely to find their energies still more severely taxed. Anything that simplifies their present work is welcome, while this volume suggests important directions in which, when an honourable peace allows us, we may make good some of the defaults compelled by war.

A Pocket Medical Dictionary. By GEORGE M. GOULD, A.M., M.D. Seventh edition. London: H. K. Lewis and Co., Limited. Pp. 1003. Price 5*s.* net.—This is the seventh revised edition of a well-known pocket medical dictionary which contains 35,000 words. The claim of the author is that the dictionary gives the pronunciation and definition of the principal words used in connexion with, and in relation to, medicine; and the popularity which the work enjoys, as shown by its successive reissues, coupled with the favourable notices which each edition has received in the press, prove that the claim has been made good. Great condensation has necessarily been employed, for it is obvious that such a number of definitions, covering the vocabulary of half a dozen ancillary sciences, and all the procedures and abstract notions arising out of practical work or scientific theorising on those sciences, could not otherwise be included in any book that could reasonably be described by the word "Pocket." This condensation, however, has not resulted in inaccuracy, and on the whole has not made for vagueness. It is quite clear that the meaning of such words as, say, "catabolism" (Dr. Gould prefers a C) and "neurasthenia"—we select two words at hazard—cannot be defined in a line, and yet the notion given in the dictionary by the definition of these words is quite sufficient to meet the needs of anyone who should require to look out their meaning. Various tables of muscles, nerves, arteries, and the micro-organisms will be found useful, and the same may be said of the comparison of thermometric scales and of the dose tables compiled from authoritative works on materia medica.

New Inventions.

ADAPTER TO CONVERT BINAURAL STETHOSCOPE INTO OTOSCOPE.

THE simple contrivance for converting a binaural stethoscope into an otoscope here described will, I trust, prove as useful to others as it has been to myself. I have not seen a description of a similar instrument. The adapter, as will be seen from the illustration, consists of a vulcanite tube about four inches in length bent at a right angle in its centre. The aural end is like the termination of an ordinary otoscope, but the proximal end is attached to a soft rubber adapter, easily



connected to the chest-piece of any binaural stethoscope. The advantages of the arrangement are: The instrument fits comfortably into the ear both of the patient and the observer without the forcible insertion often found necessary with the monaural otoscope, but not at all pleasant to either of the persons concerned. The patient can hold the vulcanite tube in his ear and his attention is thus withdrawn from the catheter. The appliance has all the advantages of binaural hearing for the observer, and it is more compact than the ordinary type of otoscope, since extra tubing, in addition to that used with the stethoscope, is not required.

The adapter has been made by Messrs. Allen and Hanburys, Ltd., Wigmore-st., London, W., from whom it can be obtained.

Hove. NOEL ADLER, L.S.A.

LITERARY INTELLIGENCE.—The Physiological Society will very shortly issue a monthly journal, entitled "Physiological Abstracts," containing abstracts of papers in physiology, comparative physiology, biochemistry, and allied subjects, edited by Professor W. D. Halliburton, King's College, London, to whom reprints of papers should be sent. Those interested and desiring further information should communicate with Professor W. M. Bayliss, F.R.S., University College, London. The journal will be published by Messrs. H. K. Lewis and Co., Limited, 136, Gower-street, at an annual subscription of 25*s.*, post free.

HOSPITALS IN BIRMINGHAM.—The annual reports of the two large Birmingham hospitals appear simultaneously. According to the 136th annual report of the General Hospital the number of in-patients under treatment during the year 1915 was 5416, including 908 children under 12 years of age. The out-patients numbered 50,879. The ordinary expenditure was £34,051 11*s.* 7*d.* and the extraordinary £146 14*s.*, while the sum of £1132 14*s.* 2*d.* was transferred to the Jaffray Branch Hospital account to meet the deficit of that institution. The total expenditure for the year was £35,330 19*s.* 9*d.* The deficit amounted to £13,213 1*s.* 11*d.* Nine members of the medical and surgical staff have been called up for service in the army, and this has added greatly to the work of the remaining members of the staff, who are practically all attached to military hospitals in Birmingham. A total of 75 former sisters and nurses are now serving in naval and military hospitals at home or abroad.—The seventy-fifth annual report of the Queen's Hospital shows that during the year 1915 3001 in-patients were treated and 24,397 out-patients. The income for the year was £12,527 and the expenditure £18,689, leaving a deficit of more than £6000. In common with other hospitals heavy demands have been made upon the services of the staff for military duties, but the work of the hospital has been carried on without interruption. Eleven members of the medical and surgical staff are attached to local military hospitals, and those who have received commissions or have enlisted include 13 from the medical staff, 31 medical students, and 27 of the nursing staff.

Reports and Analytical Records
FROM
THE LANCET LABORATORY.

INTRAMINE.

(THE BRITISH DRUG HOUSES, LIMITED, 20 TO 30, GRAHAM-STREET, CITY-ROAD, LONDON, E.C.)

THE chemo-therapy of intramine was described in THE LANCET of Jan. 29th, 1916. It was found to have a simpler composition than the arsenical types of syphilis remedies. It is a di-ortho body, and its chemical construction is described by its name, which is di-ortho-amido-thio-benzene. It is suggested that in early syphilis salvarsan should be administered first and then intramine, the order being reversed in late syphilis. The result of this treatment is spoken of most favourably. We have had submitted to us an ampoule of intramine, which contains a gramme of the substance emulsified in 10 c.c. of a cream. The intramine is administered by intramuscular injection in the form of a cream, and one advantage is that it does not oxidise on exposure to air, and, further, it is fluid at the body temperature. This interesting sulphur compound is a stable pale greenish-yellow substance not affected by the air, and while it is powerfully antiseptic it is non-toxic.

(1) HECTINE; (2) HECTARGYRE.

(THE ANGLO-FRENCH DRUG COMPANY, LIMITED (BRESILLON), GAMAGE BUILDINGS, HOLBORN, LONDON, E.C.)

1. The chief claim about hectine is that it can be successfully employed as an antisyphilitic and is far less poisonous than other arsenical compounds such as salvarsan and atoxyl, while stated to be equally effective. Its constitution is conveyed in its chemical name benzo-sulphone-para-amino-phenyl-arsenate of soda. It is a white crystalline substance readily soluble in water, which was first tried in syphilis in French clinics. In the treatment of syphilis it has been used in doses of 20 centigrammes daily dissolved in one cubic centimetre of water injected into the gluteal muscle. According to the results obtained it shows powerful anti-syphilitic properties. It is claimed to be less risky in employment than salvarsan. 2. Hectargyre is a mercurial salt of hectine which appears to combine with advantage the antisyphilitic properties of both mercury and the organic arsenic compounds. It is stated to be free from the objectionable effects of ordinary mercurial compounds. It is employed in syphilis with advantage in all its stages.

COGNAC BRANDY.

(GAUTIER FRÈRES, COGNAC. LONDON AGENCY: BROWN, GORE AND CO., 40, TRINITY-SQUARE, E.C.)

This liqueur brandy is described to be 20 years old, and we can well believe this since it possesses all the characteristics of a long-matured spirit. Further, the results of our analysis are consistent with those given by an old standard brandy produced in the Cognac district. The results of analysis were: Alcohol by volume, 46·59 per cent.; extractives, 1·10 per cent.; volatile acidity calculated as acetic acid, 0·03 per cent.; fixed acidity calculated as tartaric acid, 0·02 per cent.; mineral matter, *nil*. In regard to secondary products, the following were the results given in parts per 100,000 of absolute alcohol present: Aldehydes, 14·10; furfural, 2·10; ethers, 135. The flavour is unmistakably that of genuine brandy produced in the Charente district. It shows in particular a good etherial content, and there can be no question about its suitability for medicinal purposes.

STILL FRENCH MOSELLE.

(HATCH, MANSFIELD, AND CO., 47, PALL MALL, LONDON, S.W.)

We have been asked whether, from a medical point of view, the still French Moselles can be compared favourably with the German white wines. It has been customary on the part of many medical practitioners to recommend patients, in those cases where an alcoholic stimulant was deemed desirable, the German light wines, as showing a minimum of acidity, of sugar content and of alcoholic strength. The wine which was regarded as meeting these requirements was invariably a German white wine, but we find that the still French Moselles conform to the same standard remarkably closely. We append the analyses of two German white wines which are typical, and analyses also of three French still Moselles equally typical.

	German white wines.		French wines, still Moselles.		
	A	B	A	B	C
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Alcohol by volume	9·86	10·30	10·73	10·30	10·73
Extractives	2·28	1·95	1·55	2·00	2·30
Sugar	0·19	0·18	0·17	0·23	0·10
Tartaric acid	0·57	0·67	0·54	0·67	0·71
Acetic acid	0·16	0·15	0·07	0·09	0·01
Mineral matter	0·22	0·16	0·14	0·15	0·20

The prices of the French Moselles are respectively—A, 21*s*.; B, 25*s*.; and C, 30*s*. per dozen. It will be seen that as regards alcoholic strength the differences are inappreciable, but when we come to the French Moselles the extractives in some instances give lower results than is the case in the German white wines. Considering sugar, the French Moselles, excepting one specimen, contained less. As to fixed acidity represented in tartaric acid, there is very little difference between the two classes of wines, but when we consider the volatile acidity represented in acetic acid we find that the French Moselles are distinctly superior to the German white wines. This is an important point, since to some extent the soundness of a wine rests upon the amount of volatile acid which it contains. The less present the better, and the French still Moselles are practically free from volatile acids. It follows that where a light non-acid wine, practically also free from sugar, is desired the still French Moselles may be recommended, and they are in no way inferior æsthetically to the German white wine. We think, indeed, that the flavour of some of the still French Moselles is more attractive and elegant than that of many of the German wines.

MALTED MILK TABLETS.

(HORLICK'S MALTED MILK COMPANY, SLOUGH, BUCKS.)

These tablets are a convenient form of the well-known preparation, malted milk. According to our analysis, Horlick's malted milk has the following composition: Moisture, 4·00 per cent.; total sugars, maltose and lactose, 52·83 per cent.; dextrin, 18·30 per cent.; protein, 13·05 per cent.; fat, 7·92 per cent.; and mineral matter, 3·90 per cent. Malted milk is clearly a nourishing article and it has the attractive flavour of malt. The method of preparation has evidently a certain solvent effect upon some of the constituents, since no less than 88 per cent. of the preparation of this malted milk is soluble in water. The tablets afford a very convenient and reliable form of food (containing all classes of nutritive elements) for the man engaged in a campaign on land, on sea, or in the air. The tablets are packed in a convenient tin and their diameter is somewhere between the size of a sixpenny and threepenny piece, while they are about an eighth of an inch thick. They are intended particularly as an emergency ration for troops engaged on a forced march. They seem to us well adapted for the purpose.

NON-ALCOHOLIC BEER (THREE SHELLS BRAND).

(THE NEW BREWERY SYNDICATE, LIMITED, 47, PALL MALL, LONDON, S.W.)

According to our analysis the claims in regard to this beer are well substantiated. It contains an amount of alcohol so low as to exempt it from the category of alcoholic beverages. The total amount of alcohol present in terms of proof spirit was just short of the limit laid down for temperance beverages—namely, 2 per cent. It is not often that beverages of this character can be said to be palatable, but this beer is a refreshing and attractive drink, delicately flavoured with hop, and evincing an unmistakable and pleasant malt flavour. Though brewed from malt and hops it contains very little extractive matters. The total amounted only to 1·10 per cent., while the sugar did not amount to more than 0·05 per cent., but this is balanced to some extent by the dextrin amounting to 0·87 per cent., including hop extractives. The acidity was inappreciable. The beer shows some nutritive properties, but we regard it favourably chiefly on account of its non-alcoholic and refreshing character and its delicate bitter flavour due to hops, and hops alone. There was present some salicylic acid, but in such small amount as to interfere in no degree with the wholesomeness of the beer. It is a genuine beer, and, as such, more interesting, we think, than most aerated drinks classed generally as non-alcoholic beverages.

THE LANCET.

LONDON: SATURDAY, APRIL 1, 1916.

The Enrolment of the Medical Profession.

THE conferences of representatives of the Local Medical War Committees which were arranged by the Central Medical War Committee to take place last week should, we think, have a distinctly valuable outcome, and the medical profession owes a debt of gratitude to the British Medical Association for having arranged (and paid for) a very practical method of dissipating some of the doubts and relieving some of the difficulties attendant upon the enrolling of the medical profession for military service. We published brief notes last week on the proceedings of the conferences at Leeds and London. This week we publish notes on those at Birmingham and Bristol, and the same general lesson may be drawn from the proceedings at all four gatherings—confidence in the policy and actions of the Central Medical War Committee has been promoted by a discussion of vexed questions. The widespread anxiety lest the Central Committee should override the judgment of Local Committees in the selection of names has also been allayed. It has in this way become obvious to audiences, who are themselves representative of these Local Committees, and therefore of the greater number of medical men concerned, that no alternative presents itself to voluntary enrolment save compulsion, in the event of the military authorities demanding further recruits from the medical profession. A stratum of the profession has now been reached, as Dr. ALFRED COX reminded the representatives of the Local Medical War Committees at the conference in Leeds, where great hardship may be experienced by the interchange of civil for military work, and the chances that those hardships, being intelligently recognised, will be removed as far as possible are greater, we think, under a system of voluntary enrolment than under one of compulsion, assuming that enrolment is effected by the bulk of those concerned.

The Central Medical War Committee has never concealed either from itself or from the constituency that the work of enrolment undertaken by the Committee is delicate in the extreme; the members of the Committee, or the majority of them, quite probably share the opinion which was expressed in this journal as soon as the overwhelmingly serious nature of the war was recognised, that a conscription of the medical profession would have given a fairer result. But the time has gone by when conscription can possess the virtues that it would have possessed originally, and although many members of the medical profession at the different conferences, notably at the gatherings in Birmingham and London, expressed a preference even at this date for compulsory enrolment, we think that the voluntary enrolment scheme is preferable if the difficulties in carrying it through are met fairly and squarely. A compulsory scheme applicable only to the medical profession has been deemed impossible, and other difficulties have never been made light of by any who understand the real situation of affairs, but the work of the Central Medical War Committee has not been rendered easier by masses of criticism, some of which may have been perfectly legitimate, but some of which has been ill-inspired, and some has had a suspect origin. The following train of thought is, for example, rather tortuous:—(1) The Army Medical Staff declares that a large number of officers are required in the Royal Army Medical Corps to meet growing armies and to make good depletions; (2) but the Army Medical Staff cannot know what is required because it has never consulted its Advisory Board; (3) therefore, when the Central Medical War Committee states that more medical men are and will be wanted for commissions in the Royal Army Medical Corps the Committee is misleading the medical profession. Yet that is a fair summary of the kind of way in which the work of the Committee and the behaviour of the Army Medical Staff have been criticised in letters to lay journals and in questions addressed in the House of Commons to the Under Secretary of State for War. There have been variants in the pattern of the argument, according as to whether the critic has been chiefly concerned in acclaiming the immorality of neglecting the Advisory Board, or in finding fault with the constitution of the Central Medical War Committee, or in criticising the way in which the officers of the Royal Army Medical Corps are employed when they have been recruited; but the assumption that there has been a great deal of mismanagement by everybody has been made so persistently that those who do not know the facts may have been impressed.

But lately the public has become aware of the unsubstantiality of the strictures; some of the complainants have been proved to be wrong in their facts, and others to have erred in their deductions, while a third class have come under strong suspicion of being inspired in what they have said, not so much by a desire to help in public affairs as by an itch to damage those at whose hands they believe themselves to have suffered material damage or personal slight. Categorical stories of lamentable breakdowns have been shown to be incorrect. Clear reasons for much of the plan adopted in the organisation of the Royal Army Medical Corps have been given. A story of an extraordinarily fine bill of health in an army of unprecedented numbers makes an absolute reply to those who consider that in the absence of an Advisory Board the authorities of the Army Medical Staff did nothing, or did only that which was wrong. The medical profession has already made great sacrifices with splendid results. Its members are being asked to meet a further demand on their services which many of them can ill meet. This is fully recognised. But if all show readiness to bear the burden, the weight should fall on the shoulders fittest to carry it. And it has now been definitely stated that unless a large proportion of the remaining available medical men under 45 enrol, the scheme of the Central Medical War Committee will not be proceeded with. That Committee is now reinforced by the formation of an Advisory Committee of the Royal College of Physicians of London and the Royal College of Surgeons of England, who will assist in the task of selecting the officers for the Royal Army Medical Corps.

Prescribing of Narcotic Drugs in the United States of America.

A YEAR ago particulars were given in THE LANCET[1] of the provisions of a measure, known as the Harrison Antinarcotic Law, to control the prescribing and selling of narcotic drugs which had just come into operation in the United States. The restrictions imposed by this Act were more severe than the regulations designed for the same purpose in any other country, and it was feared in some quarters that strict administration of the new law would be accompanied by such a large growth in the clandestine traffic in these drugs as would defeat the object with which the Act was promulgated. A year's experience, however, has demonstrated not only that the Act was capable of smooth administration, but that during the period in which it has been in force there has been no sensible increase in the smuggling of the class of drugs which the Act was designed to control. Some of the larger wholesale dealers in drugs are quoted as saying that their sales of drugs of this kind have been reduced by 70 to 80 per cent., and retail traders generally seem to be agreed that the amounts supplied to the public have been materially restricted. If then it is possible in a vast country like the United States, with its immense population, to limit the distribution of opium, morphine, and cocaine to the quantities required for legitimate medicinal purposes, how much more simple would it be to control the traffic in our own country.

One of the requirements of the American Act is that every person who prescribes or sells certain narcotic drugs shall be registered for that purpose and pay an annual registration fee of $1. This in itself is a considerable matter, since it affects something like a quarter of a million persons; an official report of the first year's administration shows that there have been registered in pursuance of the Act 140,000 medical practitioners, 42,000 dentists, 1100 veterinary surgeons, 48,000 druggists, and 400 manufacturing druggists. But the provisions of the measure do not stop at registration, this only being a means of keeping under supervision all the channels through which the narcotics are distributed. Pharmacists can only obtain supplies by ordering them on official forms, and they can only supply the drugs to medical practitioners who write their orders on similar forms. Prescriptions, which must bear the patient's name and address, can be only for a definite quantity, and have to be signed with the full name of the prescriber, whose address and registered number will also appear on the prescription. The pharmacist who dispenses the prescription is required to keep it for two years, and is prohibited under penalty from repeating the medicine except on the order of a fresh prescription. Although at times the observance of these precautions might occasion inconvenience, there has apparently been no noteworthy complaint, and the authorities acknowledge that they have received the ungrudging assistance of the medical profession in their attempt to stop the abuse of narcotic drugs. As must always happen when customs are suddenly altered, there have been cases of infringement due to negligence or want of comprehension of the regulations, and presumably there always will be occasional offences; but on the whole the Act has been well observed. The number of convictions that have been registered is 314, and a fair idea of the strict manner in which the Act is being enforced can be obtained from the fact that a registered person was fined for selling cocaine to a duly qualified medical practitioner whom he understood to be registered under the Act but was not, the court holding that the plea that the seller had good reason to believe that the purchaser was entitled to buy cocaine was worthless.

At present the provisions of the Act do not apply to preparations which contain only 2 grains of opium or ¼ grain of morphine, or to preparations for external use which contain opium; but the authorities are considering the desirability of cancelling these exemptions, since they hold the view that the uncontrolled sale of even such preparations might serve to negative the good results to be expected from effectual enforcement of the new law. It is common knowledge that the opium, morphine, and cocaine habits had reached alarming proportions in the United States before this measure came into force, and since there is no evidence that the abuse of narcotic drugs in this country exists to any disturbing extent it is perhaps doubtful whether there is a need for the adoption of such stringent measures of repression in Great Britain. But the United States Legislature in enacting this law considered that they were bound to do so in order to carry out treaty obligations entered into by the States, in common with other governments; and if other parties to the treaty take as high a view of their obligations as do the United States, we may witness the enactment of replicas of this stringent law in many of the civilised countries of the world, when such time arrives as the nations have leisure to think of domestic legislation.

[1] THE LANCET, March 27th, 1915.

Annotations.

"Ne quid nimis."

MEDICAL DISEASES IN THE NEAR EAST.

AN official booklet has just been issued[1] containing in handy form memoranda on some of the diseases likely to be met with in the Near East, as well as some notes on sanitation. The diseases are arranged in alphabetical order, and under each are headings dealing with etiology, symptoms, prognosis, complications, diagnosis, differential diagnosis, prophylaxis, and treatment, with the addition in certain cases of a few lines on morbid anatomy. The booklet may therefore be regarded as a supplementary volume to a standard text-book of medicine containing the experience gained so far in the Near East brought carefully up to date. Although the chapters are anonymous, there is ample internal evidence that each has been written by an expert. To record their contents would be but to summarise what has appeared in the columns of our own and other professional journals during the last 18 months. Of special interest, however, are the short sentences relating to prevalence which commence each article. These might well be collected into a short preamble as follows:—

Cerebro-spinal fever: This disease has occurred at Salonica within recent years. In hot, dry, and sandy countries it is apt to appear in the season when dust-storms are prevalent.

Cholera: Happily at the time of writing no cases of cholera have been reported in the Mediterranean Expeditionary Force. With the advent of warm weather, however,

[1] Memoranda on Some Medical Diseases in the Mediterranean Area, with some Sanitary Notes. Wyman and Sons. 1916. Price 1s.

and the extension of the campaign to Bulgaria, it is more than likely that Asiatic cholera will appear in the war area.

Dengue: Occasionally breaks out in Egypt, has been reported from the Gallipoli Peninsula, probably visits the islands of the Ægean Sea, and is almost certainly found along the coasts of Greece, Bulgaria, and Turkey.

Diarrhœa: There were undoubtedly on the Gallipoli Peninsula and at Mudros many cases of acute diarrhœa unassociated with any form of dysentery or with flagellate infection.

Dysentery: Although happily the mortality caused by it has not been great, dysentery has been very prevalent amongst the troops serving in the Eastern Mediterranean area.

Malaria: A considerable number of cases of malaria, that most protean of all diseases, has occurred at Cape Helles and at Suvla Bay. Malaria is also endemic in and about Salonica.

Oriental sore, better known as cutaneous leishmaniasis, has occurred amongst the troops operating in Mesopotamia, and it is quite possible that cases may occur in the M.E.F., for the disease has been reported from Egypt, Arabia, Syria, Asia Minor, Turkey in Europe, and Greece.

Paratyphoid fever: Apart from dysentery and diarrhœa paratyphoid infections have undoubtedly accounted for most of the invalidings amongst men in the M.E.F. With the exception of troops which have served in India, B infections have been the more common, but there is no doubt that A infections have occurred in men who had been in contact with units from India.

Phlebotomus fever: This specific fever of short duration has a wide geographical distribution, and is known to occur in Egypt and on the Gallipoli Peninsula. It has especially affected the French at Cape Helles.

Plague: With the aggregation of ships in Eastern Mediterranean ports, the movement of Turkish and Russian troops from East to West, and the proximity of Egypt, plague may yet make its appearance in the war area.

Relapsing fever: So far there is no record of this disease having occurred among the troops of the Mediterranean Expeditionary Force, but with the extension of the campaign to the Balkans there is every likelihood that cases of what used to be called famine fever will occur. It has been recorded in the past from Salonica and Vodena.

Typhus fever: While there has been very little typhus fever amongst troops serving in the Mediterranean region, it may confidently be expected that the disease will be more in evidence throughout the winter and in the new area of hostilities.

Undulant fever is commonly known as Malta fever. It has a wide geographical distribution and has been known to occur throughout the eastern Mediterranean. Cases have cropped up amongst British troops operating in this area.

The list of diseases will be seen therefore to be a formidable one, and their prevalence in the Mediterranean area already considerable. But possibilities have been boldly faced, prophylactic measures carefully considered, and use made of the new preventive knowledge gained by recent experience, of which a digest is given in the chapters on Insect Pests and Sanitary Notes. The booklet will naturally form the vade-mecum of the Royal Army Medical Corps officer; but over and above this it will be impossible for any medical man within or without the Services to consider himself well informed without reading, marking, learning, and inwardly digesting this official handbook.

THE GALE AND A LESSON.

IT is many years since the elements have raged in this country with such fury as on the evening of March 28th, when a wind velocity of 47 miles an hour was recorded at Greenwich. Trees and telegraph posts were blown down all over the country, long-distance trains ceased to arrive at the London termini, and snow drifted in places many feet deep. Already several deaths are reported from being blown over in perilous situations, from various accidents, and from exposure on the hills. This list will probably be higher when messages again pass over the reinstated telegraph wires, and for every death from exposure scores will have suffered more or less permanently in health from the same cause. In nearly all cases where this happens the sufferer will be found to have been insufficiently or unsuitably clad. During the last 18 months millions of men have been clothed at the expense of the State in woollen garments of such texture and thickness that soaking should be impossible, and in footgear through which water percolates with difficulty. Under these conditions the conduction of heat away from the body seldom reaches a dangerous degree. It is surely time that the civilian population rendered themselves similarly immune to meteorological conditions in the winter and spring. It is a mistake to suppose that this requires heavy or thick clothing, it is largely a question of texture and uniformity. Now that fashion has relaxed her claims, the opportunity should be taken to discard paper shoes, gossamer stockings and blouses, and similar follies. When the claims are again heard, some at least will refuse to risk their lives for appearances that are often unsightly.

TORULA INFECTION IN MAN.

THE latest issued of the series of monographs from the Rockefeller Institute for Medical Research is concerned with a group of cases characterised by chronic lesions of the central nervous system, with clinical symptoms suggestive of cerebral tumour, produced by an organism belonging to the torula group. The authors of the monograph, Dr. James L. Stoddard and Dr. Elliott C. Cutler, of the Peter Bent Brigham Hospital at Boston, Mass., describe two cases in which the clinical symptoms indicated such signs of cerebral tumour as to lead to decompression or exploratory operation, but the pathological examination in each case proved the complete absence of tumour. Lesions were found, however, which fully explained the clinical symptoms and physical signs. Enormous numbers of organisms having many points of resemblance to those of blastomycosis occurred in all of the lesions in such a manner as to leave no doubt of their causal relations. The neurologist is familiar with cases to which the unsatisfactory diagnosis of pseudo-tumour has been attached, in which the accepted symptoms and signs of cerebral tumour—viz., headache, giddiness, vomiting, and optic neuritis, accompanied or not by more definite and even localising signs—are found at operation or at necropsy to have been caused by some totally distinct condition. Some reported cases, possibly incompletely examined, have remained more or less of a mystery. In the first of the two cases recorded in this monograph a woman aged 42 entered hospital on account of headaches, failing vision, giddiness, nausea and vomiting, diplopia, unsteady gait, difficulty in finding words, and disorientation. During the first two weeks of the illness the temperature ranged from 98° to 102° F. On examination double optic neuritis was present, a diagnosis of increased intracranial pressure, without localising signs, was made, and a right subtemporal decompression was practised. On incising the dura the brain appeared tense, and there was excess of fluid in the subdural and subarachnoid spaces. The patient died some ten days later after developing pneumonia and relapsing into a stuporose condition. At the necropsy a subacute or chronic meningo-encephalitis was found, with multiple foci of infection in the cerebellum, cerebral cortex, and basal ganglia. Microscopically enormous numbers of spherical organisms, of varying size, with a definite wall, were everywhere found in the lesions. Neuroglial reaction was present in the immediate vicinity of the lesions, and there was slight diffuse degeneration of ganglion cells and

myelin sheaths. In regard to the lesions themselves, many revealed areas of necrosis or caseation, such as are seen in tuberculosis, and giant cells were noted in some numbers, with oval or spherical nuclei arranged peripherally or centrally. There can be no doubt in the writers' opinion that the organism is a torula, and the features of the case are analogous, clinically and pathologically, to those of cases collected from the literature. The symptomatology of these closely resembles the clinical picture of intracranial neoplasm. A chronic, slowly progressing inflammatory process, situated in such a way as to interfere with the passage of cerebro-spinal fluid and occasion internal hydrocephalus, or leading to the formation of masses of parasites in various parts of the cerebrum or cerebellum, results in the development of symptoms of raised intracranial tension which it may be impossible to distinguish from the pressure effects of a brain tumour. There are similarities also, as is apparent, with other chronic infective conditions of the central nervous system, such as syphilis. A considerable portion of the monograph is taken up with a valuable investigation into and differential classification of the diseases formerly called blastomycosis. As a result of much personal experimental research, succinctly summarised in the monograph, the authors publish an elaborate table of differential points between torula infection, oidiomycosis (usually termed blastomycosis), and coccidioidal granuloma. In the general discussion which concludes the paper reference is made to the fact that torulæ were proved years ago by several observers to have marked pathogenic action in animals, with frequent production of brain lesions. How common this type of infection is in man is unknown, but many facts indicate the possibility of its being frequently present without recognition. The organism is probably not always very pathogenic in man, and lesions may be recovered from. In the healed stage the lesions are those of a slightly atypical tuberculosis, and the condition may thus be passed over. Experimental lesions in animals are sometimes quite indistinguishable from miliary tubercles without caseation. The general conclusions of a suggestive and valuable piece of work are that the factors which will aid the recognition of torula infection consist of: Discovery of early lesions in internal organs before the parasite is destroyed; realisation of the finer points of difference from tuberculosis; complete microscopical brain examination; cultures, especially on carbohydrate media at room temperature; and injections of fluids and cultures into white rats intraperitoneally, with microscopical examination especially of the brain.

EFFECT OF FATIGUE ON GASTRO-INTESTINAL ACTIVITY.

Dr. Ludwig Kast, of New York, has investigated the effects of fatigue on 54 patients and healthy subjects to test the motor power of the stomach and intestines. The stomach-pump and X rays were employed; to determine the time of elimination of the intestinal contents carmine was used, a standard test diet being given for a number of days. By taking the average, it was determined how long it took the stomach, and separately, how long it took the intestines, to propel the given amount of food. During the period of the tests the amount of physical activity was regulated and the mental activity approximately limited. Without any change of diet or of mental activity, the physical activity was markedly increased or decreased, and the effects of the same upon the evacuating power of the stomach or intestines observed. At other times, without change in the diet or the amount of physical exercise, the amount of mental efforts was markedly increased or decreased and the effects observed. It appears that the healthy individual showed very little variation as regards the evacuating power of the stomach or intestines as long as the physical exercise was not excessive. Mental efforts had no perceptible effect. In patients with moderate degree of atony and splanchnoptosis the evacuating power of the stomach and intestines decreased in direct proportion to the amount of mental and physical exertion. Physical exertion had the same effect in such individuals if the patient was kept in a horizontal position during these exercises and during the period of observation in order to eliminate the effect of splanchnoptosis in the erect position. In patients who clinically appeared susceptible to the effects of fatigue mental exertion was more marked in its delaying effect than physical exertion.

RELATION OF HIGH ARTERIAL TENSION TO ALCOHOL.

MUCH difference of opinion exists as to the part played by alcohol in the causation of high arterial tension, arterio-sclerosis, and interstitial nephritis. After carefully studying the question Lancereaux, the well-known French clinician, stated that alcohol does not favour the production of arterio-sclerosis. At the Académie de Médecine of Paris M. Camille Lian has reported an interesting investigation which his position as surgeon to a Territorial regiment enabled him to make. With the Pachon-Lian sphygmometer he took the blood pressures in the afternoon of 150 men, all aged 42 or 43 years. Without consulting the results he investigated their habits as to alcohol and divided them into four classes: 1. Sober, those who took less than a litre of wine daily and no spirits. (A litre of cider or beer was considered equivalent to half a litre of wine.) 2. Medium drinkers, those who took 1 to 1½ litres of wine daily and no spirits. 3. Great drinkers, those who took 2 to 2½ litres of wine or a smaller quantity and one or two *apéritifs* or *petits verres*. 4. Very great drinkers, those who took at least 3 litres of wine or a smaller quantity and four to six *apéritifs* or *petits verres*. The number of each group in whom the blood pressure was above normal—that is, the maximum pressure above 15 cm. of mercury and the minimum above 10—was then noted. The results were as follows: Sober, 16 men, blood pressure above normal 1 (6·25 per cent.); medium drinkers, 53 men, blood pressures above normal 4 (7·5 per cent.); great drinkers, 57 men, blood pressures above normal 10 (17·5 per cent.); very great drinkers, 24 men, blood pressures above normal 6 (25 per cent.). The greater frequency of high blood pressure as the consumption of alcohol increased showed that this substance was an important factor in causation. It might be objected that the increased pressure may have been due to other causes. But in such a number of subjects it was to be expected that these causes would be distributed without marked difference amongst the various groups. Moreover, the men were examined for stigmata of syphilis and questioned as to other infections and intoxications. After eliminating the cases in which another factor could have been in play it was found that the percentages of high pressure in the four groups were not sensibly altered.

HEALTH OF THE POST OFFICE STAFF.

IN his report for the year 1914–15 the Postmaster-General states that the health of the staff has again been satisfactory. The average sick-rate of the established staff during the year ended Dec. 31st, 1914, was 7·5 days for men and 11 days for women, and of the unestablished staff 4·8 days for men and 5·7 for women. The deaths through causes other than war recorded through the year show an annual death-rate of 3·3 per 1000 for men and 1·2 for women on the established staff. Of the 319 men who died the average age on death was 41, and the average length of service 17 years. Of the 38 women who died the average age was 32 and the length of service 10 years. 680 men and 161 women retired on account of ill-health at an average age in the case of men of 46, and in the case of women 35, the average length of service being in the case of men 24 years, and in the case of women 15 years. In 1912 the proportion of deaths and retirements from tuberculous diseases to deaths from all causes and retirements from ill-health in the Post Office was 14·5 per cent.: it appears from the Registrar-General's annual return for 1912 that in the case of persons in the United Kingdom between the ages of 15 and 65 the proportion of deaths from tuberculous diseases to deaths from all causes was 20·7 per cent. In 72 per cent. of the cases of tuberculosis occurring during 1914 there was a history either of previous tuberculous disease in the family or of previous illness predisposing to tuberculosis in the patient. The number of fresh cases arising in 1914 showed a substantial decrease as compared with those of the foregoing year. Every facility is granted to Post Office servants suffering from tuberculosis to obtain sanatorium treatment where a reasonable probability of recovery exists. Of the cases occurring during 1914, which were completed before the end of the year, about 35 per cent. of those who received sanatorium treatment were able to resume duty as compared with 16 per cent. in the case of those who did not receive such treatment. An examination of the cases of neurasthenia occurring during 1914 showed that in the majority of cases the disease was attributable to physical causes or to domestic troubles.

THE OPERATIVE TREATMENT OF OSTEO-ARTHRITIS.

THE main cause of the disability met with in cases of osteo-arthritis is the lipping of the edges of the articular surfaces of the bones entering into the affected joints. From time to time surgeons have removed one or more nodules of bone from such joints, but it has been left for Mr. W. I. de C. Wheeler to perform a definite operation for the purpose of relieving the disability of sufferers from this disease. He operated, as mentioned in last week's issue of THE LANCET (p. 678), on a patient who had been crippled for seven years by osteo-arthritis. He removed all the newly formed bone from the left knee and from the right hip, with the result that the patient, who before the operation had been able to walk only with the help of crutches, no longer needed their assistance, and further walking caused no pain. Mr. Wheeler is to be congratulated on the success of his operation. Unfortunately, the report does not give the age of the patient, though we gather from his remarks that the patient had not passed middle age. Be this as it may, we consider that the operation can reasonably be tried in suitable cases, for the relief of pain and of the lack of mobility which osteo-arthritis entails is worth more than the little risk attending such an operation. On one point we disagree with Mr. Wheeler, and that is on the name chosen for his operation. He has called it cheilotomy, and this obviously means "cutting the lip," and the name, no doubt, refers to the removal of the lipping of the bones, but we would urge him to endeavour to find a more suitable appellation for the operation he has devised, for such a name as cheilotomy should be reserved for an operation on the lips.

DR. GIORGIO MENINI.

THE death occurred on March 6th of Giorgio Menini, perhaps the ablest pupil of Grocco in the Istituto di Studi Superiori at Florence. A brilliant academic career led up to his speedy promotion as "Libero Docente" in pathology and as director of the clinical laboratory of the Santa Maria Nuova Hospital. State hygiene was another field in which he showed exceptional proficiency, insomuch that the Government charged him, in that interest, with a special mission, first to the Island of Sardinia, and then, during the Balkan War, to Albania. Among the Mussulman population he soon became a general favourite, his work in sanitary rehabilitation winning their gratitude and their confidence, and overcoming the distrust with which Christian intervention is received, often resented, by the "Faithful." Throughout the whole Sanjacate of Berat the presence of "Menini Italiano" was not only a medical but a political force. Returning to his post in Florence, he showed signs of impaired health, but no inducement or friendly admonition could wean him from professional duty, beloved as he was by his students and in constant request as a consultant by an ever-increasing *clientèle*. Within the last few days his resisting power seemed to relax with ominous rapidity, and he died while not yet 40 years of age, leaving behind him a sense of loss in which the profession and the public participate hardly less than his colleagues and immediate friends.

AT the Royal Society of Medicine on Thursday, April 13th, at 5 P.M., Mr. J. E. R. McDonagh will open a discussion on the Rationale and Practice of Chemo-Therapy, to which leading chemists have been invited.

UNIVERSITY OF LONDON OFFICERS TRAINING CORPS.—The Military Education Committee which was appointed to deal with the administration of the University of London Contingent of the Officers Training Corps shows by its seventh annual report that on Dec. 31st, 1915, the establishment included a medical unit consisting of four sections of a field ambulance. The numerical strength of this unit is owing to war conditions not given, but during the training year ending Sept. 30th, 1915, the cadets numbered 415, of whom 95 proceeded to commissions. During the year the following officers joined the medical unit: Major G. E. Gask, Captain W. Gilliatt, Captain R. D. Maxwell, Lieutenant J. H. Ryffel, and Second-Lieutenant A. Rodd. In an appendix to the report the list of former officers of the University who have fallen in the war includes the name of Captain G. C. McKay Mathison, A.A.M.C., and in the list of former cadets who have been killed are the names of R. Fazan, F. E. Harger, T. S. Lukis, M. Pern, and W. R. Pryn. As a consequence of the Military Service Act the Officers Training Corps of the University of London is now open only to students and other persons desirous of training for commissions who are under the age of 19 years. Application for enrolment should be made to the Adjutant, 46, Russell-square, W.C.

FOOD ECONOMICS IN RELATION TO THE WAR.

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II.[1]

Foods the Home-supply of Which it is Most Desirable to Amplify.

BESIDES wheat, which the Government is wisely encouraging the farmers to grow more of, we should seek to increase the output of peas and potatoes. These all possess the double virtue of being highly nutritious and admitting of long storage. Peas, which contain a high percentage of protein, are almost as nutritious in the dried state as when fresh. There would be no difficulty in increasing their output enormously. In 1913 the acreage of peas was only 161,121, as against 1,184,857 of potatoes and 3,983,448 of oats.

The subject of market-gardening requires careful consideration. Green vegetables are essential and a modicum of fruit is desirable, but the cultivation in large quantities of such vegetables as asparagus and tomatoes, and such fruits as grapes and strawberries, should not be encouraged. It entails too much money and labour, and is only justifiable where there has already been an initial outlay upon them. The question whether acorns, beech-nuts, and horse-chestnuts might be used for human food is worth considering. An agreeable flour can be made from acorns by maceration and subsequent drying and grinding, as has long been known to the Californians and other primitive peoples. In any case, all the available acorns should be gathered, for they are a valuable food for pigs and sheep. Horse-chestnuts can be made into a suitable food for animals. Like acorns, they contain some 40 per cent. of oil, and yet thousands of tons of these valuable seeds have recently been allowed to rot.

Coming now to live stock, the breeding of pigs should certainly be encouraged, and I see no reason why we should not have as large a proportion of these animals as Germany has. During the last 40 years the stock of pigs in that country has been increased from 7,000,000 to 20,000,000, while in England the number has recently fallen by nearly a million, and now totals little more than 3,000,000. Our annual expenditure on imported bacon, ham, pork, and lard amounts to about £27,000,000 sterling. Pig-farming has the advantage over sheep and cattle-farming in that the pig needs little more ground than the stye it occupies, although, of course, it uses up the products of the soil, notably in the shape of barley-meal, which, unfortunately, at the present time is considerably above the normal price. An immense amount of food suitable for pigs, which should go to the swill-tub, is lost in this country, owing to the lack of organised methods of collecting it in the towns. One of the special virtues of the flesh of the pig is that it lends itself so well to the processes of curing, and can be so conveniently stored.

Dairy-farming should be encouraged chiefly for the purpose of increasing the home-supply of butter and cheese, which we annually import to the value of about £24,000,000 and £7,000,000 sterling respectively.

Poultry-farming has met with little success in this country. Nevertheless it should be developed, chiefly, I think, with the object of increasing the output of eggs, which we import to the value of some £9,000,000 sterling annually. Eggs admit of ready storage. The chief expense of poultry-farming lies in the large quantity of corn required, but while it is economical to convert corn into eggs it is doubtfully economical to turn it into mature chicken fit for the table. I therefore suggest that the young cockerels should be killed off early, say when they reach the size of a partridge, at which stage they furnish the acceptable dish known as *poussin*.

It is hardly necessary to say that pheasant rearing is, from the point of view of food economy, highly wasteful, and only justifiable on a very limited scale.

Food Consumption.

It is our clear duty at the present time to exercise rigid economy in the matter of food consumption. By reducing the expenditure on food by £1 yearly per head (i.e., less than ¾*d.* a day and rather more than 4½*d.* a week) we should effect an annual saving of more than £45,000,000—i.e., an amount more than sufficient to pay the interest at 4½ per cent. on a loan of £1,000,000,000 sterling. I believe that by properly regulating the kind and quantity of food consumed and by minimising wastage such a saving is possible, and this not only without any sacrifice of the national health but with an actual improvement of it. Great economy could also be effected by reducing the consumption of alcohol. In 1915 the national drink bill was something more than £164,000,000. It is true that much of this huge sum goes back to the country as duty, but more than three-fourths of it represents a dead loss of wealth. To advise the nation to save this great sum is, I fear, a counsel of perfection. Nevertheless it would be a grand thing if we could rise to the occasion and all agree to abstain from alcoholic drinks during the period of the war. In this way we should, at a stroke, save the consumption of the thousands of tons of grain (70,000,000 bushels annually) employed in the manufacture of beer and spirits, divert a vast amount of energy now employed in brewery, distillery, and drink shop into more profitable channels, and improve the health and raise the morale of the nation.

There are at least four ways of reducing the consumption of food: (1) By preparing the food in the most economical way; (2) by minimising waste; (3) by selecting the right kinds of food and in the right proportions; and (4) by limiting to a sufficiency the quantity of food consumed. It is clearly of the utmost importance to prepare food in the most economical way and to prevent unnecessary waste. The best means of effecting these ends are receiving considerable attention just now, and there is no need for me to deal with this subject. Considerable economy may be effected by choosing the right kinds of food and taking them in the right proportions. In order to reduce to a minimum the amount of food required, the protein, saccharide,[2] and fat need to be proportioned somewhat as follows: fat, 1; protein, 2·5; saccharide, 10. If the food consists chiefly of bread and potatoes, then in order to provide the necessary quantity of protein an excess of saccharide has to be consumed. If, again, it is mainly of the animal variety, the needful supply of saccharide can only be obtained at the expense of an excess of protein. The most common error in this country in apportioning these three great classes of foodstuffs is to

[1] Article No. I. was published in THE LANCET of March 25th, p. 686.

[2] By *saccharide* I mean *carbohydrate*.

consume an excess of saccharide in the shape of bread, puddings, potatoes, and sugar, and too little fat. This is especially the case with the poor.

Man a Mixed Feeder.

The question how far man is adapted for animal and how far for vegetable food is one on which the public should be correctly informed. Man is neither purely carnivorous nor purely vegetarian: he is a mixed feeder. Some contend that he is by nature purely vegetarian, and that a strict vegetarian diet is more conducive to health than a mixed, and a vegetarian enthusiast has recently suggested that the present would be a good time for the nation to exclude animal food altogether, on the ground that the food production of this country could be greatly increased if the farmer ceased to breed cattle, sheep, and pigs, and devoted himself exclusively to the cultivation of vegetable food—above all, of the cereals. While admitting that every effort should at once be made to increase the home supply of wheat, we must be careful to avoid the sentimental error of supposing that man is by nature strictly vegetarian, no matter how anxious we may be to adopt a diet which does not involve the rearing of animals for slaughter. The fact is, as I have elsewhere endeavoured to show,[3] it was by virtue of persistent slaughter, continued through many thousands of centuries, that man evolved from the ape—that he grew into a being endowed with speech and reason and with aspirations beyond the grave. I have no doubt that it was the attraction of animal food which led the pre-human ape to abandon the forest for the plains, and that the conditions entailed by hunting were the chief factors in determining his evolution into man.

Other factors also operated. Intertribal warfare was, I believe, one of these, and I mention it here because it bears upon a question of burning interest at the present time—the influence of warfare on evolution. All are agreed that whatever influence modern warfare may have in bracing up and stimulating a nation to meet difficulties, it has a disastrous effect eugenically, seeing that it causes an elimination of the physically fittest, and in a country like our own, which adopts the voluntary system, of the bravest, most spirited, and most conscientious—in short, of those with the most grit. A strong argument, by the way, against a strictly voluntary system. While, however, modern warfare is a grave hindrance to evolution, I believe that primitive warfare played a not inconsiderable part in furthering it, notably in the psychic sphere, for it was a warfare of tribe against tribe, and its general effect was to cause a survival of the most brainy, most courageous, and most energetic tribes at the expense of their less gifted antagonists. This process continuing through many thousands of years, must have led to a steady evolution of the qualities which secured victory. This is a further illustration of my contention that man has evolved through slaughter. Strange, indeed, it is that he—the roof and crown of things—should have fought his way upward by bloodshed, and that from the standpoint of evolution modern warfare should have an effect the exact opposite of the old-time warfare of tribe against tribe.

Let us now consider the various types of animal and vegetable food consumed in this country.

[3] Man's Mental Evolution. Past and Future. THE LANCET, May 3rd (p. 1260), 10th p. 1335), 17th (p. 1408), and 24th (p. 1473), 1913.

Animal Foods.

The following are our chief animal foods:—Beef, veal, milk (cheese, butter), mutton, lamb; pork (lard), bacon, ham; rabbit, game; poultry, eggs; fish. The value in millions sterling of imported animal food for the year 1913 was as follows:—Bacon and ham, 20·4; beef, 16·1; mutton, 10·9; pork, 1·6; butter, 24·3; cheese, 7·4; eggs, 9·5; fish, 4·8; lard, 5·5; margarine, 0·39. Of the various kinds of animal food rabbit and fish are the most economical, meat the most expensive. It occurs to me that a considerable wastage of fish might be prevented if more of it were smoked, salted, or otherwise cured. Surely no particle of edible fish should be thrown away. Those who are not risking their lives at the front must learn not to be over fastidious about their food. The importance of reducing the consumption of meat is generally acknowledged. It is well to remember that dislike of fat may lead to considerable waste by increasing the scraps left on the plate. A person who dislikes mutton fat, for instance, may not extract from a mutton chop one half its nutrient value. Such wasteful meat eaters should before all others restrict their meat diet at the present time. Fat constitutes a most important item of our food, and none of it should be wasted. Nearly all who cannot eat the fat in a cut off a joint relish dripping in cakes or simply spread on bread, as well as beef suet in puddings. In the case of families thus inclined as much of the fat of the meat as possible should be used as dripping or suet. This is important because the dietary of many people, notably children, is apt to be deficient in fat. One of the virtues of the flesh of the pig is the large amount of fat it contains. Many who cannot eat fat meat relish fat ham and bacon and lard worked up in cakes.

Milk.—It is very generally but erroneously believed that the child, as distinguished from the babe, needs milk and would suffer greatly if the supply of dairy milk suddenly failed. As a matter of fact, dairy milk has injured children far more than it has profited them. Milk, affording as it does a peculiarly favourable soil for the growth of disease germs, has carried disease and death to hecatombs of children. Not only has it been the chief means of conveying tuberculosis to them, but it has further acted injuriously by favouring the consumption of soft, pappy foods, such as sops and milk puddings, on the evils of which I shall have occasion to dwell later. It goes without saying that the infant, like the young of other mammals, requires milk for the first period of its life, and that the proper milk for it is its own mother's. When this fails, as it sometimes does (mainly, however, owing to unhealthy upbringing), milk from some other mammal, such as the cow or goat, has to be substituted, and we must, I suppose, gratefully acknowledge the service which non-human milk has rendered in enabling us to rear infants artificially. But even in this sphere it has not proved an unmixed blessing, in that it affords an excuse to unwilling mothers not to nurse their infants and not to regulate their lives in a way calculated to develop the nursing function. While, however, the infant needs milk of some kind during the first nine or ten months of life, it does *not need any after that period.* It is strange how the belief to the contrary has arisen. Why should the young of man any more than the young of any other mammal require milk after it has left the breast? It is only since man first domesticated the cow and the goat,

and this from the point of view of his evolution was but as yesterday, that he has been supplied with any milk other than human, and it is absurd to suppose that before that time his health suffered from the lack of cow's or goat's milk. To this day many pre-agricultural tribes are without any. When Australia was discovered, and this was only a few hundred years ago, the natives had not cultivated one square foot of that great continent; their only domesticated animal was a half-wild dog, and not one of them had ever tasted any other milk than woman's. Nevertheless, they were a vigorous healthy race with magnificent teeth. I mention this latter fact because I have heard it seriously suggested that the lack of an adequate supply of dairy milk is the chief cause of bad teeth among the poor of this country.

My point is not that dairy milk is a useless food for man, but merely that it is not essential to him after the nursing period. Its chief value to the human race, so it seems to me, is as a source of butter and cheese, two highly concentrated and agreeable foods, admitting of prolonged storage: not only cheese but salt butter may be kept for many months. For both these articles we are largely dependent upon foreign supplies. In 1913 we imported butter to the value of £24,000,000, and cheese to the value of £7,000,000. Would it not be wise, during the period of the war at least, to reduce our consumption of milk to a minimum and to make as much butter and cheese as possible, especially the latter, on account of the large amount of protein it contains? Plain cheeses, such as Cheddar and Cheshire, should be made in preference to the richer kinds, such as Stilton, which serve rather as savouries than as sources of nutriment. Some milk is required for infants and invalids; some also may be reserved as a flavouring for tea. Save in the case of invalids the quantity used for cooking (e.g., for milk puddings, cabinet pudding, batter pudding, Yorkshire pudding, trifle, and blanc-mange) should be reduced to a minimum. Puddings made of flour and suet, such as suet dumplings, roly-poly, and fruit or meat puddings, boiled or steamed, are, if anything, more wholesome than those containing milk, butter, and eggs.

Vegetable Foods.

Our vegetable foods may be classified as follows:—The cereals: wheaten flour (macaroni, vermicelli, semolina), oatmeal, rice, maize. Starch: sago, tapioca, arrowroot. Sugar. Vegetables: cooked (potatoes, peas, greens, &c.), and uncooked (salads). Fruits: luscious (apples, strawberries, grapes, &c.) and nuts. Beverages: tea, coffee, cocoa.

The cereals.—Of the various cereals consumed in this country wheat (wheaten flour), oats (oatmeal), and rice occupy the first place. Oatmeal is the most nutritious, containing as it does even more protein than wheat and considerably more fat. Rice is the least nutritious of the three, and inasmuch as it is for the most part consumed in a soft or even pappy form which does not invite mastication, and is moreover wholly imported into this country, we could very well dispense with it. Oatmeal porridge is a valuable food, but like rice (as served in this country at least) it does not conduce to mastication. Further, it uses up a lot of milk which might be better employed for making cheese and butter. We should therefore take the precaution to chew our porridge carefully and to be sparing in our use of milk with it. Oatmeal biscuits constitute a valuable food, and favour efficient mastication. Wheat has a double advantage over other cereals—it has the most delicate flavour and contains a large amount of gluten. Consequently, wheaten flour, unlike the flour of other cereals, is readily kneadable and can therefore be made into bread, macaroni, vermicelli, pastry, and all sorts of puddings and cakes. At the present time we need to exercise the utmost economy in our use of wheaten flour, and it should be reserved almost entirely for making bread and boiled suet "crust" (suet pudding, fruit pudding, meat pudding). Plain home-made cake and plain biscuits may be made in moderation, and even plain pastry; but rich pastry and fancy cakes, and such articles as buns, scones, tea-cakes, all of which are abundantly displayed in our confectionery shops, should be abandoned.

Bread has been aptly described as the staff of life. A good hunch of crusty bread, thoroughly chewed, with butter and cheese or fat bacon, followed by a little raw fruit, such as an apple, constitutes an ideal meal. Not only does it provide the needful nutritive ingredients, but it gives the teeth and salivary glands ample work, and leaves the mouth in a "hygienic" state. We have heard a great deal lately of potato bread. This is quite a pleasant food and it is a good plan to make it of cooked potatoes which might otherwise be wasted.

Starch.—Tapioca, sago, and arrowroot virtually consist of pure starch. Seeing that they are all imported and that our cereal food and potatoes afford the necessary quantity of starch, we shall do well to dispense with them, although there is no harm in using arrowroot for invalids. Tapioca and sago, as well as rice, are largely employed for milk puddings—in this country far too largely. These puddings use up a lot of milk which should be reserved for butter and cheese, and they belong to the injurious class of pap foods on which our children are fed all too copiously—but more of this later.

Sugar.—In view of the fact that all the sugar consumed in this country is imported and has to be paid for in exports, it is very desirable that it should not now be consumed in unnecessary amount. Widespread misapprehension prevails as to the value of sugar as a food. The fact is that we could get on very well without any sugar at all. Primitive man had none but the limited quantity furnished by wild honey. Nowadays, by the cultivation of the sugar-cane and beetroot, our yearly supply runs into thousands of tons, and it is consumed by the inhabitants of this country in vastly greater quantities than was the case even a few generations back. Because sugar is so cheap and has a high "caloric" value it is supposed to be an economical food for the poor. This, as Dr. Sim Wallace points out, is a fallacy: "Every penny spent on sugar by the poor is from the point of view of nutrition simply wasted, inasmuch as the poor are by force of circumstances compelled to obtain the great bulk of their nourishment from cereals and potatoes, which contain a relative superfluity of saccharide material." And it should be remembered that starch enters the blood in much the same form as cane sugar—i.e., as a monosaccharide. Sweetstuff shops do an infinity of harm, for unless special precautions are taken—and they rarely, if ever, are—sweets are highly injurious to the teeth; we should be better off without them. In many parts of the country where war allowances abound the sale of sweets, as of many other unnecessary articles, has gone up enormously during the war.

All money spent on sweets is worse than wasted. None should be thus spent. The money saved in this way should be loaned to the State, and the tens of thousands of persons engaged in the sweet industry be transferred to occupations more profitable to the country. The surest way of economising in sugar is to put a heavy tax upon it. Our annual import of this article costs us some £22,000,000 sterling. One half of this could quite easily be saved.

It is true that sugar is useful for preserving purposes, but even here its consumption might with advantage be considerably reduced. From the point of view of nutriment jams are of little more value than sugar alone. Not only do they consist of some 75 per cent. of sugar, but most of the virtue of the fresh fruit is lost in the process of boiling. Moreover, while fresh fruit cleanses the mouth and teeth and thus promotes "oral hygiene," jams leave the mouth in an unhygienic state and tend to give rise to decay of the teeth.

Vegetables.—Practically all our vegetables are home-grown, and perhaps for this reason people are apt to be very wasteful with them. Special care should be taken not to waste the highly nutritious potato.

Fruits.—Provided there is an adequate supply of vegetables, fruit, though a useful adjunct to the dietary, could, if the necessity arose, be dispensed with entirely. Imported fruits, such as oranges, apples, bananas, figs, and dates, are not necessary. A question of some difficulty is how to deal with the excess of home-grown fruits (e.g., plums, apricots), which are highly perishable. It is not desirable to make large quantities of jam, for this would use up much sugar which, as we have seen, is not a necessary food. But fruit can be bottled by the use of no more than a dessert-spoonful of sugar to the pound, or even, I understand, without any sugar at all. The fruit is placed in a receptacle. This is filled up with water. It is then sterilised by heat for half an hour, and finally sealed hermetically by means of a screw top.

Tea, coffee, and cocoa.—These are unnecessary, and inasmuch as they are all imported they should be economised to the utmost. Tea and coffee are pure stimulants and have no actual nutritive value. In a time of stress we could do without them quite well. Cocoa, besides being slightly stimulant, is nutritious, but it is an expensive food.

(To be concluded.)

CANADA.

(FROM OUR OWN CORRESPONDENTS.)

Public Health Department needed in Canada.

Dr. Steele, M.P. for North Oxford, Ontario, introduced into the Canadian House of Commons recently a resolution calling for the immediate creation in the Canadian Government of a Department of Public Health. The need for such a department was greater now than it ever had been, and would be still greater as soon as the war is ended, Canadians anticipating an enormous immigration into the Dominion from European countries. At the present time health matters coming under the jurisdiction of the Federal Government are administered from eight or ten different departments of the public service. The object would be to consolidate these under one responsible Minister of the Crown. It is claimed that 40 per cent. of Canada's infant mortality could be saved were there a properly constituted department of health to look after such matters. The Canadian Medical Association appointed a special committee as long ago as 1901 on this very subject, and year after year the matter has been urged upon the Government at Ottawa, but no step has been made forward in the 15 years.

Health and Hygiene in Montreal.

During the year 1915 a series of conferences was held in Montreal under the auspices of the Department of Health in connexion with the campaign against tuberculosis and infant mortality. In all 147 lectures were given and the average attendance was over 200. The Health Department has decided to continue these conferences during 1916. In the month of January another new public bath was opened in the city, making a total of 14 baths now under municipal direction. These are available to women upon certain days of the week.

The Care of the Feeble-Minded.

In January a meeting was held in Toronto to discuss the care of the feeble-minded in Canada, on the basis of the report of the Special Commission of the Ontario Government. The statistics presented proved the great prevalence of feeble-mindedness throughout the Dominion, and the report suggested remedies, including classes for backward children in the public schools, suitable institutions for the education of the worst cases, compilations by the medical officer of health of a register of defectives, a psycho-educational clinic, a farm cottage system, the appointment of a permanent board whose membership might include the Provincial Secretary, the Minister of Education, and the Lieutenant-Governor of the province. The increase of the feeble-minded in Canada is a serious matter, which must continue to claim the attention of the provincial governments.

Military Hygiene in Victoria, B.C.

A regiment of fine men, hunters, lumbermen, and the like, is quartered at Victoria in a drill-hall which, as anyone with any expert knowledge of such things can see, is most unsuitable for a barrack, with its small amount of window area per man. Further, it is dusty and overcrowded. The sick-list is said to be very high, and two men have died of pneumonia after measles. The officers of the regiment, medical and lay, are reported to be in protest unavailingly, and recruiting is being pushed also to replace the men who have died, men who, it is thought, need not have been lost had the request of the commanding officer been granted for leave to put his regiment under canvas. This case requires to be very quickly dealt with by the authorities, for it was under just such conditions that in the "fifties" of last century the British Guards used to lose so many men from phthisis. Nowadays more is known of barrack hygiene, and consumption is kept down by avoiding overcrowding.

March 4th.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENTS.)

Plague and Rat Destruction.

THE plague deaths in India during the week ending Jan. 29th numbered 6620 against 8533 cases. The Bombay Presidency and Sind had 1772 deaths, the Madras Presidency 366. Bihar and Orissa 582, the United Provinces 1239, the Punjab 40, Burma 347, the Central Provinces 778, Mysore State 130, Hyderabad State 1271, Central India 81, and Kashmir 14. The smoking out of rats is being vigorously carried on throughout the Punjab, especially in those villages where plague was recently seen and where plague is again appearing. The work is now done by means of a bellows which blows the fumes from burning bhoosa and sulphur into the rat-holes. The smoke traverses from one house to another, and appears out of the holes in the walls and floors of houses adjacent. The effectiveness of this work is, however, sadly diminished by the customary difficulty of getting the villagers to combine for a common object. Thus, although the rats in the houses properly smoked out are really killed, those in the houses where objections were raised spread again through the village.

The Detection of Milk Adulteration.

A bulletin, No. 57, of the Pusa Research Institute, entitled "The Detection of Added Water in Milk in India," by Dr. J. W. Leather, the Imperial agricultural chemist, states that the usual English method for detection of added water

is practically useless in India. In England the total solids must not be less than 8·5 per cent., while in India a wider limit is admissible, as there is no means of ascertaining the respective proportion of buffalo and cow's milk when mixed. Thus any fair standard for solids would be too high for cow's milk alone, and a standard even as high as 8·3 per cent. would still leave it open to the buffalo milk vendor to add from 10 to 20 per cent. of water without fear of detection. Dr. Leather describes two other methods for the detection of added water—the refractive index of the milk serum and the freezing-point of the milk. The former would hardly detect 10 per cent. of added water. The latter method he finds much more dependable, and by it the addition of even very small quantities of water are readily detected.

Small-pox Epidemic in Madras.

The existence of small-pox in an epidemic form in Madras is notified, and the health department of the Madras corporation is doing its best to grapple with the disease, which is said to have been introduced by the large influx of visitors during the Christmas holidays. Just now there are a large number of pilgrims from the north passing through Madras on their way to Rameswaram.

Plantain Juice as an Antidote for Snake-bite.

The *Times of Ceylon* reports that at Colombo, in the presence of a large gathering, including doctors, Mr. Donald Obeysekere demonstrated the efficacy of plantain juice as an antidote to snake-bite. Mr. Obeysekere liberated a cobra from a gunny-bag face to face with a valuable bull terrier, upon which the demonstrator's confidence in his remedy led him to experiment. The dog, however, broke the cobra's back after a ten minutes' fight, during which he had succeeded in avoiding its fangs. The bull terrier was then held off, and a village pi-dog was brought in and was severely bitten by the snake. It howled with pain and collapsed in a few minutes. The dog was then given plaintain juice freshly expressed from some young trees of no particular variety, and when about a breakfast-cup had been administered it is stated that the dog began to revive. Within half an hour it was on its feet, and the doctors present were satisfied that it had got over the effects of the poison. The journal adds that the experiment was then repeated with a cock, which was likewise bitten badly and recovered. Dr. Fabian Hirst, who was present, was asked to make further experiments, the result of which will be awaited with interest.

March 5th.

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.[1]

IN the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census, 7859 births and 5722 deaths were registered during the week ended Saturday, March 25th. The annual rate of mortality in these towns, which had been 17·8, 17·2, and 17·9 per 1000 in the three preceding weeks, fell in the week under notice to 16·5 per 1000 of their aggregate population, estimated at 18,136,180 persons at the middle of the year 1914. During the first 12 weeks of the current quarter the mean annual death-rate in these towns averaged 15·6, or 0·4 per 1000 higher than that recorded in London. The annual death-rate last week ranged from 4·3 in Enfield, 6·3 in Ilford, 6·6 in Eastbourne, 8·1 in Walthamstow, and 8·8 in Ealing, to 22·9 in Preston, 23·0 in Liverpool, 23·1 in Dewsbury, 25·5 in Tynemouth, 27·0 in Swansea, and 28·5 in Barrow-in-Furness.

The 5722 deaths from all causes were 493 fewer than the number in the previous week, and included 391 which were referred to the principal epidemic diseases, against 345 and 378 in the two preceding weeks. Of these 391 deaths, 137 resulted from whooping-cough, 115 from measles, 65 from infantile diarrhœal diseases, 53 from diphtheria, 12 from scarlet fever, and 9 from enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 1·1 per 1000, and equalled that in the previous week. The deaths attributed to whooping-cough, which had been 114, 85, and 93 in the three preceding weeks, rose to 137, and caused the highest annual death-rates of 1·2 in Derby and in Stockport, 1·3 in Gateshead, 1·8 in Cambridge and in Stockton-on-Tees, and 2·1 in Warrington. The deaths referred to measles, which had increased from 62 to 127 in the seven preceding weeks, fell to 115; the highest death-rates from this disease were 2·0 in Grimsby, 2·9 in Newport (Mon.), 3·0 in Swansea, 3·4 in Tynemouth, 3·5 in Stockton-on-Tees, and 7·2 in Rochdale. The fatal cases of diarrhœa and enteritis (among infants under 2 years), which had been 65, 60, and 68 in the three preceding weeks, fell to 65, and included 14 in London, 7 in Birmingham, 5 in Manchester, and 3 in Liverpool. The deaths attributed to diphtheria, which had been 82, 54, and 61 in the three preceding weeks, fell to 53, of which 11 occurred in London, 5 in Birmingham, and 3 in Liverpool. The deaths referred to scarlet fever, which had been 17, 13, and 19 in the three preceding weeks, declined to 12, and included 2 in St. Helens. The 9 fatal cases of enteric fever, of which 2 were registered in Sheffield, were equal to the average in the earlier weeks of the quarter.

The number of scarlet fever patients in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had declined from 2257 to 1839 in the nine preceding weeks, further fell to 1783 on Saturday last; 210 new cases were admitted during the week, against 234, 216, and 193 in the three preceding weeks. These hospitals also contained on Saturday last 1443 cases of diphtheria, 237 of whooping-cough, 120 of measles, and 49 of enteric fever, but not one of small-pox. The 1435 deaths from all causes in London were 166 fewer than in the previous week, and corresponded to an annual rate of 16·6 per 1000. The deaths referred to diseases of the respiratory system, which had been 373, 344, and 405 in the three preceding weeks, fell to 337 in the week under notice, and were 142 below the number registered in the corresponding week of last year.

Of the 5722 deaths from all causes in the 96 towns, 171 resulted from violence and 429 were the subject of coroners' inquests, while 1664 occurred in public institutions. The causes of 42, or 0·7 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in London and in its 14 suburban districts, in Leeds, Bristol, Bradford, Hull, Newcastle-on-Tyne, and in 58 other smaller towns. Of the 42 uncertified causes, 11 were registered in Birmingham, 6 in Liverpool, 3 each in Manchester, and Tynemouth, and 2 each in St. Helens, Rochdale, Preston, Blackpool, and Darlington.

[1] The Scottish and Irish figures are not forthcoming owing to the delay in the mails.

VITAL STATISTICS OF LONDON DURING FEBRUARY, 1916.

In the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases, it appears that the number of persons reported to be suffering from one or other of the 10 diseases specified in the table was equal to an annual rate of 6·0 per 1000 of the population, estimated at 4,516,612 persons; in the three preceding months the rates had been 7·8, 6·3, and 6·5 per 1000 respectively. The lowest rates in the month were recorded in Kensington, Chelsea, the City of Westminster, St. Marylebone, and Hampstead; and the highest rates in Stoke Newington, Finsbury, Shoreditch, Bethnal Green, and Stepney. The prevalence of scarlet fever showed a further decline from that recorded in other recent months; this disease was proportionally most prevalent during the month in Holborn, Finsbury, Shoreditch, Bethnal Green, and Greenwich. The Metropolitan Asylums Hospitals contained 1956 scarlet fever patients at the end of the month, against 2896, 2431, and 2157 at the end of the three preceding months; the weekly admissions averaged 210, against 329, 248, and 249 in the three preceding months. Diphtheria was slightly more prevalent than it had been in the preceding month; among the several boroughs the greatest proportional prevalence of this disease was recorded in Stoke Newington, Stepney, Battersea, Wandsworth, and Camberwell. The number of diphtheria patients under treatment in the Metropolitan Asylums Hospitals, which had been 1551, 1476, and 1491 at the end of the three preceding months, had risen again to 1538 at the end of the month; the weekly admissions averaged 198, being 195, 177, and 198 in the three preceding months. The prevalence of enteric fever showed a slight increase; this disease was proportionally most prevalent in Paddington, Kensington, the City of Westminster, Poplar, Lambeth, and Wandsworth. There were 50 enteric fever patients under treatment in the Metropolitan Asylums Hospitals at the end of the month, against 57, 50, and 44 at the end of the three preceding months; the weekly admissions averaged 7, which was also the average in each of the three preceding months. Erysipelas was proportionally most prevalent in Paddington, Shoreditch, Bethnal Green, Poplar, and Woolwich. The 19 cases of puerperal fever notified during the month included 3 in Bethnal Green and 2 each in St. Pancras, Islington, and Lambeth. The 30 cases of cerebro-spinal meningitis included 4 in Kensington, 3 in Hackney, 3 in Shoreditch, 3 in Bermondsey, 2 in St. Pancras, and 2 in Finsbury; the 2 cases of poliomyelitis belonged to St. Pancras and Stepney respectively.

ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING FEBRUARY, 1916.

(Specially compiled for THE LANCET.)

CITIES AND BOROUGHS.	Estimated population in the middle of 1914.	NOTIFIED CASES OF INFECTIOUS DISEASE.												DEATHS FROM PRINCIPAL INFECTIOUS DISEASES.										
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever.	Erysipelas.	Cerebro-spinal meningitis.	Poliomyelitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhœa and enteritis (under 2 years).	Total.	Annual rate per 1000 persons living.	Deaths from all causes.	Death-rate per 1000 living.†
LONDON...	4,516,612	—	883	841	—	41	4	19	245	30	2	2065	6·0	—	30	21	62	123	3	64	303	0·9	5023	14·5
West Districts.																								
Paddington	142,056	—	23	19	—	2	—	—	12	—	—	56	5·1	—	1	1	2	3	—	1	8	0·7	167	15·2
Kensington	170,817	—	17	14	—	3	—	—	9	4	—	47	3·6	—	—	—	1	—	—	4	5	0·4	184	13·9
Hammersmith	124,750	—	20	21	—	—	—	1	4	—	—	46	4·8	—	3	—	1	—	—	1	5	0·5	122	12·6
Fulham	158,849	—	19	30	—	—	—	1	5	—	—	55	4·5	—	—	—	2	2	—	—	4	0·3	147	12·5
Chelsea	63 791	—	6	10	—	1	—	1	1	1	—	20	4·1	—	—	—	2	4	—	2	8	1·6	82	16·0
City of Westminster ...	152,346	—	30	11	—	2	—	—	6	1	—	50	4·3	—	—	—	2	3	—	4	9	0·8	155	14·0
North Districts.																								
St. Marylebone	112,892	—	16	6	—	1	1	—	8	1	—	33	3·8	—	2	1	1	4	—	4	12	1·4	127	15·0
Hampstead	86,731	—	10	6	—	1	—	—	1	—	—	18	2·7	—	1	—	—	1	—	—	2	0·3	63	10·0
St. Pancras	212,497	—	59	40	—	1	—	2	6	2	1	111	6·8	—	1	2	2	4	1	2	12	0·7	271	16·6
Islington	324,764	—	68	38	—	2	—	2	8	1	—	119	4·8	—	—	4	4	6	1	2	17	0·7	387	15·1
Stoke Newington... ...	50,454	—	13	18	—	1	—	—	—	1	—	33	8·5	—	—	—	2	—	—	1	3	0·8	55	13·5
Hackney	223,724	—	25	46	—	2	—	1	16	3	—	93	5·4	—	2	—	3	7	—	1	13	0·8	234	13·7
Central Districts.																								
Holborn	45,861	—	14	8	—	—	—	—	2	—	—	24	6·8	—	—	—	—	1	—	—	1	0·3	44	12·5
Finsbury	83,212	—	26	20	—	1	—	—	6	2	—	55	8·6	—	4	2	2	—	—	2	10	1·6	120	18·6
City of London	17,129	—	3	3	—	—	—	1	—	1	—	8	6·1	—	—	—	—	—	—	—	—	—	23	18·2
East Districts.																								
Shoreditch	108,869	—	34	16	—	1	3	—	13	3	—	70	8·4	—	—	2	2	5	1	6	16	1·9	131	16·2
Bethnal Green	127,662	—	38	28	—	1	—	3	13	—	—	83	8·5	—	1	—	4	5	—	2	12	1·2	148	15·7
Stepney	273,265	—	62	84	—	3	—	1	16	—	1	167	8·0	—	3	2	2	19	—	3	29	1·4	336	16·7
Poplar	160,222	—	24	31	—	2	—	—	18	1	—	76	6·2	—	—	1	1	5	—	2	9	0·7	202	16·2
South Districts.																								
Southwark	186,941	—	40	40	—	1	—	1	10	1	—	93	6·5	—	1	—	4	9	—	5	19	1·3	224	15·7
Bermondsey	124,213	—	20	23	—	—	—	—	8	3	—	54	5·7	—	—	1	3	2	—	1	7	0·7	140	14·7
Lambeth	296,724	—	46	40	—	5	—	2	11	1	—	105	4·6	—	1	—	5	6	—	4	16	0·7	341	14·7
Battersea	167,338	—	37	50	—	1	—	1	9	1	—	99	7·7	—	2	2	2	4	—	5	15	1·2	170	13·3
Wandsworth	338,998	—	80	100	—	4	—	1	18	1	—	204	7·8	—	—	—	10	7	—	3	20	0·8	318	12·3
Camberwell	262,020	—	50	70	—	1	—	—	10	—	—	131	6·5	—	—	—	1	7	—	4	12	0·6	274	13·4
Deptford	109,182	—	22	12	—	1	—	—	8	—	—	43	5·1	—	5	—	—	4	—	2	11	1·3	143	16·9
Greenwich	96,037	—	26	16	—	1	—	1	3	—	—	47	6·4	—	3	2	1	5	—	1	12	1·6	122	16·3
Lewisham	172,433	—	30	15	—	2	—	—	10	1	—	58	4·4	—	—	—	2	5	—	2	9	0·7	148	11·0
Woolwich	122,836	—	25	26	—	1	—	—	14	1	—	67	7·1	—	—	1	1	5	—	—	7	0·7	145	15·8
Port of London	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Including membranous croup. † The death-rates are corrected for variations in sex and age constitution of the populations of the several boroughs, the population of England and Wales being taken as the standard.

The mortality statistics in the table relate to the deaths of persons actually belonging to the several boroughs, the deaths occurring in institutions having been distributed among the boroughs in which the deceased persons had previously resided; the death-rates from all causes are further corrected for variations in the sex and age constitution of the populations of the several boroughs. During the four weeks ending Feb. 26th the deaths of 5023 London residents were registered, equal to an annual death-rate of 14·5 per 1000; in the three preceding months the rates had been 16·2, 17·3, and 13·5 per 1000 respectively. The death-rates for the month ranged from 10·0 in Hampstead, 11·0 in Lewisham, 12·3 in Wandsworth, 12·5 in Fulham and in Holborn, and 12·6 in Hammersmith, to 16·6 in St. Pancras, 16·7 in Stepney, 16·9 in Deptford, 18·2 in the City of London, and 18·6 in Finsbury. The 5023 deaths from all causes included 303 which were referred to the principal infectious diseases; of these, 30 resulted from measles, 21 from scarlet fever, 62 from diphtheria, 123 from whooping-cough, 3 from enteric fever, and 64 from diarrhœa and enteritis among children under 2 years of age. No death from any of these diseases was recorded in the City of London; among the metropolitan boroughs they caused the lowest death-rates in Fulham, Kensington, Hampstead, and Holborn: and the highest rates in Chelsea, St. Marylebone, Finsbury, Shoreditch, Stepney, and Greenwich. The 30 cases of measles were equal to only one-seventh of the corrected average number in the corresponding period of the five preceding years, and included 5 in Deptford, 4 in Finsbury, 3 in Hammersmith, 3 in Stepney, and 3 in Greenwich. The 21 fatal cases of scarlet fever were 4 in excess of the average number, and included 4 in Islington and 2 each in St. Pancras, Finsbury, Shoreditch, Stepney, Battersea, and Greenwich. The 62 deaths from diphtheria were 12 more than the corrected average number; this disease was proportionally most fatal in Chelsea, Stoke Newington, Finsbury, Bethnal Green, Southwark, Bermondsey, and Wandsworth. The 123 deaths from whooping-cough were 17 above the corrected average, the highest death-rates from this disease being recorded in Chelsea, Shoreditch, Bethnal Green, Stepney, Southwark, Greenwich, and Woolwich. The 3 deaths from enteric fever were 10 below the corrected average number, and belonged to St. Pancras, Islington, and Shoreditch respectively. The mortality from diarrhœa and enteritis among children under 2 years of age was proportionally greatest in Chelsea, St. Marylebone, Shoreditch, Southwark, and Battersea. In conclusion, it may be stated that the aggregate mortality in London in February from the principal infectious diseases, excluding diarrhœa, was 39·1 per cent. below the average.

THE SERVICES.

ROYAL NAVY MEDICAL SERVICE.

Surgeon J. H. Wright, Reserve List of Medical Officers, has been promoted to the rank of Staff Surgeon on the Reserve List of Medical Officers.

ARMY MEDICAL SERVICE.

Temporary Lieutenant-Colonel W. H. Willcox, R.A.M.C., to be temporary Colonel.

ROYAL ARMY MEDICAL CORPS.

Major J. Powell is restored to the establishment.

Major R. Jones, R.A.M.C. (T.F.), to be temporary Lieutenant-Colonel.

To be temporary Majors: G. D. Gray and Captain E. W. H. Groves, R.A.M.C. (T.F.).

Captain A. F. C. Martyn is seconded for service with the Egyptian Army.

E. W. Skinner to be temporary Captain.

The undermentioned temporary Lieutenants relinquish their commissions: O. Barton, N. Keith, J. A. Thoms, W. K. Hall, and E. N. Drier.

To be temporary Lieutenants: D. P. Thomas, A. G. Alexander, W. G. Harnett, A. J. Chillingworth, H. M. Harrison, R. A. Quinn, J. I. Enright, C. E. G. Bateman, J. G. T. Thomas, B. S. Simmonds, D. S. Graham, A. A. E. Newth, J. R. Wylie, H. W. Harding, J. Young, G. C. B. Hawes, A. E. Foerster, C. W. Morrison, W. J. Porteous, J. S. Annandale, A. J. D. Rowan, A. Morgan, W. G. Weston

J. St. J. Dundon, C. R. Howard, J. T. H. Madill, N. J. Judah, J. B. Yelf, J. F. Mackenzie, J. E. Manlove, C. O'Malley, S. C. W. Iredale, G. B. Mason, C. Townshend, C. L. Forde, P. A. McCallum, T. R. Davey, C. Costello, A. A. B. Scott, W. Scot, W. H. Soady, E. Nuttall, J. K. Bell, J. Cathcart, J. J. Dowdall, W. H. Thomas, W. J. Murphy, J. C. Anderson, R. C. Corbett, W. G. Thomas, E. B. Morley, J. F. Nicholson, R. B. Gorst, D. A. Crow, G. L. Lawlor, J. B. Fairclough, S. A. McClintock, A. H. Arnott, P. C. Conran, A. C. Lambert, R. E. McLaren, I. O'Keeffe, E. C. Lindsey, and R. V. Murphy.

Temporary Honorary Lieutenants to be temporary Lieutenants: S. R. Prall and W. Thomas.

Canadian Army Medical Corps: N. C. Wallace to be temporary Honorary Major. F. J. Ewing to be temporary Captain.

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

Lieutenants (on probation) C. A. Slaughter and W. L. A. Harrison are confirmed in their rank.

TERRITORIAL FORCE.

Royal Army Medical Corps.

Highland Mounted Brigade Field Ambulance: Captain A. Mowat to be temporary Major whilst in command of a Field Ambulance.

Yorkshire Mounted Brigade Field Ambulance: Captain A. H. Benson to be temporary Major whilst in command of a Field Ambulance.

East Lancashire Field Ambulance: Major W. L. Bentley to be temporary Lieutenant-Colonel whilst in command of a Field Ambulance.

Lowland Field Ambulance: Major M. Dunning to be temporary Lieutenant-Colonel whilst in command of a Field Ambulance.

South Midland Field Ambulance: Lieutenants to be Captains: H. N. Crowe, W. J. F. Craig, and J. Bannerman.

Northumbrian Field Ambulance: Lieutenant P. J. Sheedy to be Captain.

Wessex Field Ambulance: Lieutenant E. H. Helby to be Captain.

Eastern General Hospital: Lieutenant O. Inchley to be Captain.

London General Hospital: Major J. Calvert to be Lieutenant-Colonel. Captain F. W. Andrewes to be Major. Major (temporary Colonel, A.M.S.) A. H. Tubby to be Lieutenant-Colonel, and remain seconded. The undermentioned Captains to be Majors:—F. F. Burghard, and remain seconded, A. M. Gossage, and H. F. Waterhouse.

Northern General Hospital: Lieutenant H. W. Kerrigan to be Captain.

Western General Hospital: Lieutenants F. H. Lacey and J. T. Williams to be Captains.

London Sanitary Company: C. N. Atlee to be Lieutenant.

North Midland Divisional Sanitary Section: Lieutenant A. White to be Captain.

East Anglian Field Ambulance: Captain L. H. Hutchins relinquishes his commission on account of ill-health. Lieutenant (temporary Captain) G. C. Gray to be Captain.

London (City of London) General Hospital: Lieutenant R. J. W. A. Cushing to be Captain.

Wessex Casualty Clearing Station: Lieutenant T. J. Wright to be Captain.

West Lancashire Divisional Sanitary Section: Lieutenant A. Reid, from London Sanitary Company, to be Lieutenant.

London (City of London) Field Ambulance: Lieutenant A. H. Platt to be Captain.

Southern General Hospital: To be Captains: Lieutenants K. H. Gill and G. L. Wilkinson.

London (City of London) Sanitary Company: Lieutenants to be Captains: M. Greenwood, P. Hartley, and E. R. Matthews.

Eastern Mounted Brigade Field Ambulance: To be Lieutenants: E. H. Coyne and P. J. Smyth.

Welsh Border Mounted Brigade Field Ambulance: Lieutenant W. Morgan resigns his commission.

Highland Field Ambulance: G. Torrance to be Lieutenant.

Home Counties Field Ambulance: C. C. Robinson to be Lieutenant.

London Sanitary Company: A. E. Jury to be Lieutenant.

South Midland Casualty Clearing Station: To be Lieutenants: A. G. Banks and C. A. Raison.

Attached to Units other than Medical Units.—To be Majors: Major W. M. Hamilton, from the Territorial Force Reserve, and Captain D. E. Dickson. To be Captain: Lieutenant L. S. Willcox. To be Lieutenants: H. Jacques and P. A. Chillcott. Major G. S. Mill relinquishes his commission on account of ill-health.

The Arnott gold medal for conspicuous gallantry at the front was presented to Captain W. Loughman, R.A.M.C., on St. Patrick's Day by the Irish Medical Schools' and Graduates' Association.

Correspondence.

"Audi alteram partem."

THE DANGER TO CIVILIAN COMMUNITIES OF A TYPHOID-PARATYPHOID OUTBREAK.

To the Editor of THE LANCET.

SIR,—As one who has taken a special interest in enteric fever for many years and has had opportunities of looking at this disease from a varied point of view, I was naturally very interested in your annotation on this subject in THE LANCET of Feb. 12th and also in the letter in the following issue by Dr. R. Donaldson, whom I had the pleasure of meeting a short time ago when I was attracted to Reading by the news that there had been an unusual amount of enteric fever in that town.

I may say at once that, in my opinion, the danger of an outbreak of the enteric group of diseases caused by the return of soldiers from the front is very small indeed. The carrier is, of course, the indirect cause of all outbreaks, either through water, milk, flies, or direct contact, but provided reasonable precautions are taken with milk and water the risk from direct contact is insignificant. Let me give briefly a few of the reasons for this belief. We start with the fact that experience in India and at home has shown that about 2 per cent. of cases of enteric fever become chronic carriers. Every town in England must contain a large number, the total having been estimated by some to be as much as 4 per 1000 of the population, yet the enteric-rate in English towns is steadily declining, while the actual number of cases attributed to this cause works out at about 1 in 10,000 per year, although overcrowding and squalor are not unknown among the poorer classes. In December, 1904, an epidemic of 1000 cases broke out in Lincoln, but during the time that the temporary and chronic carriers were returning to their homes in increasing numbers the number of cases was steadily decreasing, until in August there were none at all, and since 1904 the enteric-rate of Lincoln has continued to diminish.

Again, if direct contact is a dangerous source of infection the disease ought to be common in troopships. For the last 25 years an average of about 50,000 troops have travelled in this way, and numerous carriers must have been present among the invalids and men returning from India, Egypt, and South Africa; yet, according to army medical reports, cases contracted on board ship are very rare indeed. After the South African War the number of carriers must have been considerably increased in England, but the disease has steadily diminished.

To come to Reading, where the outbreak is attributed to the soldiers, if it were due to the cases in the War Hospital one would expect it to focus round that area, but it is not so. If it is due to soldiers in billets, Reading so far is the only town that reports an excess of the disease, though we may assume that the conditions are the same as in most towns and even villages in England. Dr. Donaldson thinks that because out of 40 cases one was paratyphoid A a military source of the disease is probable. As it is only within the last few years that any notice has been taken of paratyphoid fevers, the actual number of such cases occurring in England is rather an unknown quantity. In India, where blood culture has been practised for several years, experience shows that the bacilli found in blood of patients treated in enteric wards are very varied in character.

These considerations naturally make one ask if the water-supply as a cause can be absolutely excluded. Dr. Donaldson admits that "the only obvious thing in common to all the cases is the water-supply, which, being river water, might conceivably be incriminated"; he does not state, though I have been so informed, that B. coli were present in 1 c.c. of water. The medical officer who went to Reading to report on behalf of the military authorities permits me to say that he certainly thought the outbreak was due to water in some way or other.

I have long been of opinion that the danger of infection by direct contact from carriers has been very much exaggerated. We invalid carriers out of the army into civilian life, but apparently nothing happens. The Local Government

Board Reports show numerous cases of infection by direct contact, but they occur among a population of millions, and include milk epidemics. It is generally agreed in India that, although milk and water epidemics have occurred, enteric in the past was chiefly due to some other cause. This could hardly have been direct contact from carriers, as it can be shown easily that the disease was one of stations and seasons and had no relation to the probable number of carriers among the troops, and the sudden decline of the disease started before the practice of isolating carriers commenced. To my mind the strongest argument against the case for carriers is the fact that even with soap and water it is difficult to disinfect the hands if soiled with infected fæces. We know in India that natives get enteric fever, so there must be carriers among them. The ordinary native servant, a vegetable feeder, has his bowels open twice a day, and completes his toilet by directly handling fæcal matter. Next he cleans his hands with water, possibly with mould, and then probably proceeds to prepare bread and butter, or handle tea-cloths or clean plates for his master's table. Under such conditions the amount of enteric fever should be enormous, yet Bombay and Calcutta, both cities with a large European population, have been singularly free from it for the last 30 years.

The question of carriers is very important. At the present time we are keeping a large number of beds in hospitals occupied by convalescents, and sometimes by perfectly healthy men, because we are afraid to let them out into barracks. Does the danger warrant our taking all this trouble and incurring all this expense and keeping fighting men from the front? My answer is: Let the urine only of typhoid convalescents be examined; take every precaution with the rare and dangerous urinary carrier, but ignore altogether the fæcal carrier.

I am, Sir, yours faithfully,

N. FAICHNIE,

Tidworth, Hants, March 23rd, 1916. Lieutenant-Colonel, R.A.M.C.

THE SHORTAGE OF DRUGS.

To the Editor of THE LANCET.

SIR,—Even in military hospitals one is constantly hampered by the shortage of indispensable drugs. The poorer part of the population must suffer far more. The shortage of the salicylate group is most grievous, and I write to suggest the importance of growing the common willow, *Salix alba*, as well as wintergreen, *Gaultheria procumbens*, and birch, *Betula lenta*. Wintergreen and willow will grow on any damp soil without cultivation. Thousands of acres of such soil are wasting in Britain and Ireland, and although the war may be over before we can utilise their medicinal products, there is always use and demand for oil of wintergreen and salicin.—I am, Sir, yours faithfully,

March 24th, 1916. J. C. MCWALTER, M.A., M.D., M.R.I.A.

"ALBUMINURIC NEURO-RETINITIS."

To the Editor of THE LANCET.

SIR,—Dr. Samuel West, in his letter in your issue of March 25th, differentiates albuminuric retinitis into two forms, the exudative and the degenerative, and contends that they are distinct, that the distinction is fundamental, and that they stand in a different relation to two forms of chronic nephritis. These conclusions, he tells us, are the result of long clinical experience, presumably at a general hospital. Possibly ophthalmic cases seen at a general hospital differ in some mysterious way from those met with at a special hospital.

Eighteen years' clinical and pathological experience at ophthalmic hospitals, so far from affording material confirmatory of his views, directly contravenes them. Dr. West's types, if such they may be called, are found also in acute nephritis and in the nephritis of pregnancy. The latter, it is to be observed, has as its most prominent feature a fatty degeneration of the tubal epithelium, and is not really an acute inflammation. So far from any particular appearance of the retina being pathognomonic of a particular variety of kidney disease, no absolute reliance can be placed upon retinal appearances as a distinctive character. In diabetes, for instance, a condition exactly resembling the "typical" albuminuric variety of retinitis is so often found that the examination of the urine alone will reveal the causal agency. This fact is a well-known pitfall for the unwary at ophthalmic hospitals. Many cases of this disease are characterised by the presence of small brilliantly white spots situated in the retina and occupying chiefly the region of the macula; but according to Dr. West these spots are found only in cases of granular kidney. The same is true of leucocythæmia, pernicious anæmia, and arterio-sclerosis and cerebral tumour. The late Sir William Gowers instances a case of intense neuro-retinitis in a chlorotic girl in which, after the subsidence of the swelling, the picture might very well be taken as an example of the "degenerative" type, which, if we take Dr. West as our guide, is pathognomonic of granular kidney. Since albuminuric neuro-retinitis is essentially a degenerative process, nothing is gained by labelling it "degenerative"; to do so is pleonastic.

Both of the types which Dr. West regards as distinctive and of fundamental importance from the diagnostic standpoint are due to the same cause, passive œdema and vascular degeneration. Neither type can be said to be either distinctive or pathognomonic.

I am, Sir, yours faithfully,

Bayswater, W., March 27th, 1916. EDGAR CHATTERTON.

TREATMENT OF SEPTIC WOUNDS WITH GLYCERINE AND ICHTHYOL.

To the Editor of THE LANCET.

SIR,—At a Divisional Rest Station in France, where practically all the operations were of the type carried out in the surgical out-patient department of a civil hospital—namely, the opening of superficial abscesses—it was decided after reading Major Duggan's articles in the *Journal of the Royal Army Medical Corps* to try dressing these cases with glycerine and ichthyol instead of boric fomentations. At first a 20 per cent. but later a 10 per cent. solution spread on ordinary white lint was used, and then for economy commercial instead of pure glycerine was employed. Fifty-nine cases were thus treated after operating under an anæsthetic, besides many others of which no record was kept and in which no anæsthetic was necessary. They included carbuncles, whitlows of all types, and three cases of cellulitis, two of the upper and one of the lower limb.

In favour of this treatment are:—1. Saving of labour and material—one application daily in place of three boric fomentations. 2. Efficiency as a dressing. Several of the cases had been previously treated with boric foments; in these the discharge was never more in 24 hours on the one glycerine and ichthyol dressing than on any one of the fomentations, though these had been changed twice and thrice daily. 3. The dressing does not adhere to the wound. 4. Men voluntarily told the nursing orderlies that they found the ichthyol dressing more soothing. This treatment is therefore recommended to medical officers, civil and military, for use in dressing superficial septic sores and wounds, as being equally efficacious as the boric fomentation, and more economical as regards time and material.

I am, Sir, yours faithfully,

G. G. ALDERSON, M.B., B.C. Cantab., F.R.C.S. Eng.,
Captain, R.A.M.C.

MEDICAL PRACTITIONERS AND AFTER-WAR PROBLEMS.

To the Editor of THE LANCET.

SIR.—The time at which a large number of practitioners who have left their practices and are now serving their country in various parts of the United Kingdom and abroad will be able to return to civil life is, of course, as yet quite uncertain, but it is obvious that a certain amount of anxiety is being felt, and it may not be considered premature to call attention to this matter through your columns.

After the South African War many societies were formed, having for their object the closer association of medical men who had seen service in that campaign. The problems involved in the present war are infinitely more exacting and vital.

The suggestion is put forward that instead of waiting till after the war, an association might be at once formed of practitioners interested. A central organising committee consisting of those serving in, or near, London would be necessary, and the support likely to be accorded the movement from those serving in distant stations could be easily estimated.—I am, Sir, yours faithfully,

March 24th, 1916. TWENTY MONTHS' SERVICE.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

Died.

Captain R. F. Hebbert, I.M.S., was a student of St. Thomas's Hospital, London, and joined the Indian Medical Service when he qualified in 1906.

Colonel J. Harper, R.A.M.C. (T.F.), Assistant Director of Medical Services, 1st London Division (T.F.), qualified in 1881, and was in practice in London.

Wounded.

Lieutenant-Colonel E. A. Wraith, R.A.M.C., 1st North Midland Field Ambulance (T.F.).

Captain G. D. Ferguson, R.A.M.C., attached to the Royal Field Artillery.

Captain R. Condy, R.A.M.C.

Lieutenant J. P. Musson, R.A.M.C., attached to the 2nd Suffolk Regiment.

Lieutenant J. Young, R.A.M.C.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Captain J. A. Graham, 7th Lincoln Regiment, youngest son of the late Brigade-Surgeon H. W. Graham, Bengal Army.

Lieutenant M. E. King, 13th Battalion Middlesex Regiment, third son of the late Dr. H. W. King, of Chester, Brigade-Surgeon-Lieutenant-Colonel of the Cheshire Volunteer Infantry Brigade.

Second Lieutenant G. K. Smith, 5th Middlesex Regiment, younger son of Dr. H. Smith, of Chatham.

Second Lieutenant C. W. Kenyon, Royal Sussex Regiment, attached to a Trench Mortar Battery, son of Dr. G. H. Kenyon, of Horsham, Sussex.

THE CENTRAL MEDICAL WAR COMMITTEE: CONFERENCES OF REPRESENTATIVES OF LOCAL MEDICAL WAR COMMITTEES.

We published last week an account of the conferences which have been held at Leeds and London between representatives of the Local Medical War Committees of the districts. The following notes deal with the conferences at Birmingham and Bristol.

The conference of representatives of the Local Medical War Committees in the Midlands and North Wales was held in the Midland Medical Institute, Birmingham, on March 23rd. The chair was taken by Dr. W. J. Garbutt, chairman of the Birmingham Local Medical War Committee, and the arrangements were made by Mr. J. J. Bekenn, honorary secretary of the same committee. There were about 100 present, including a number of Birmingham medical men of military age. Major Lucas, Mr. N. Bishop Harman, and Dr. Alfred Cox attended on behalf of the Central Medical War Committee. After a statement had been made on the general situation, questions were invited and answered. The questions were very similar to those raised at the Leeds and London meetings as reported in THE LANCET of March 25th. The representatives of the North Staffordshire Committee were anxious that the Central Medical War Committee should issue some general plan for dealing with the practices of men who had died on service. The example of Nottingham, which formulated such a scheme in September last, was mentioned, and the representatives of the Central Committee undertook that some model arrangement should be issued to Local Committees. A suggestion was made that the Central Committee would be improved if it contained representatives of provincial industrial practice. In reply it was pointed out that the Committee had no power to coöpt more members, and that any change in its composition must be dealt with at the next Representative Meeting. The representative of Mid-Staffordshire moved a resolution from that committee urging that if enrolment were necessary the Government should make it compulsory. Other representatives declared that they had no mandate to vote on such a proposition, and the chairman ruled it out of order. Votes of thanks to the representatives of the Central Committee and the chairman closed a very successful meeting.

The conference of representatives of the Local Medical War Committees in the South-Western and Western Counties and in Central and South Wales was held in the University at Bristol on March 24th. The chair was taken by Mr. G. T. Myles, chairman of the Bristol Local Medical War Committee, and Mr. H. F. Devis, honorary secretary of that committee, was responsible for the arrangements. There were over 30 representatives present. Mr. T. Jenner Verrall, LL.D., chairman, and Dr. Alfred Cox, one of the secretaries of the Central Medical War Committee, attended on behalf of that Committee. Mr. Verrall and Dr. Cox dealt with the reasons for the adoption of the enrolment scheme and many of the general difficulties connected with it. Questions were then invited. Strong exception was taken from more than one area to the presence in Territorial hospitals of men of military age who had not undertaken the Imperial obligation. Mr. Verrall pointed out that the Central Committee had been definitely and officially informed that all medical men of military age holding Territorial commissions would be asked either to sign the obligation or resign. He undertook that inquiries would be made as to the cases raised at the meeting. The Swansea representatives stated that the action of certain medical men who had attested and had been exempted or granted postponement by the local tribunal had had a very bad effect on the work of their committee, so much so that they had resolved not to press for enrolment. They declared that the military representative at the tribunal had taken no action to prevent medical men from being exempted—rather the reverse. Representatives from Glamorgan and from Somersetshire stated that the action of the Local Insurance Committees in placing unnecessary difficulties in the way of men who desired to offer for military service made it doubtful whether any more men could be got from those areas. Mr. Verrall asked that such cases should be reported fully to the Central Committee, which would undertake to place them before the Commissioners, who up to now had shown every disposition to facilitate panel practitioners going on military service. The North Glamorgan representative said he saw no better plan for satisfying the medical needs of the army than the enrolment scheme which, if a success, would redound to the credit of the profession. He urged those present to put all their energies into it. Votes of thanks were passed to Mr. Verrall, Dr. Cox, and the chairman of the meeting.

JOINT COMMITTEE OF THE ENGLISH ROYAL COLLEGES TO ADVISE ON MEDICAL RECRUITING.—Last week we noted the recent resolution of the Royal College of Physicians of London expressing its willingness to join the Royal College of Surgeons of England in forming an Advisory Committee to give advice to the Government in relation to medical men in the metropolitan district required for service in the army, and to assist in cases of special difficulty arising elsewhere in England and Wales, and coming before the Central Tribunal of the Military Service Act. This Advisory Committee has now been appointed, the names being: from the College of Physicians, Dr. Frederick Taylor (President), Dr. J. Galloway, Dr. Sidney Martin, and Dr. W. Pasteur; from the College of Surgeons: Sir W. Watson Cheyne (President), for whom when absent Sir Rickman J. Godlee will act, Mr. William F. Haslam, Mr. D'Arcy Power, and Mr. Charles Ryall. The joint committee has already commenced its sittings at the College of Physicians and Mr. F. G. Hallett is acting as secretary. It was understood from the outset that the opinion of the Advisory Committee should be transmitted to the Government Department concerned through the Central Medical War Committee without alteration. The College of Surgeons made the further suggestion that time would be saved by the institution of a preliminary survey of the minimum necessities of the several metropolitan hospitals and medical schools in respect of staff. The appointment of this Advisory Committee by the English Colleges should go a long way to set the minds of those at rest who desired a consideration of their personal difficulties from the general standpoint of medical practice and ethics.

WOUNDED ALLIES RELIEF COMMITTEE.—At the English Military Hospital at Limoges, maintained by the Wounded Allies Relief Committee, five French soldiers were recently presented with the Croix de Guerre.

THE King of Serbia has conferred the Third Class of the Order of St. Sava upon Lieutenant-Colonel H. E. M. Douglas, V.C., C.M.G., D.S.O., R.A.M.C., Deputy Assistant Director of Medical Services.

OBITUARY OF THE WAR.

ARTHUR RYLAND CHAVASSE, B.A., M.B. OXON., M.R.C.S.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain A. R. Chavasse, who died in France at No. 2 General Hospital, B.E.F., on March 12th, as a result of broncho-pneumonia, was aged 27 years, and was the only son of Lady Chavasse and the late Sir Thomas Chavasse, of Birmingham. He was educated at Harrow School and Hertford College, Oxford, and entered St. Thomas's Hospital, where, after graduating as B.A. and M.B. at Oxford, he held the house appointments of physician, obstetric physician, and casualty officer. He was also resident medical officer to Queen Charlotte's Hospital. He surrendered this appointment in 1914 to join the Red Cross Society in France, then entering the Royal Army Medical Corps as a temporary lieutenant, and working first at Netley and then at No. 4 and No. 2 General Hospitals in France. A fellow officer writes of him that he was devoted to his work and loved by all who came in contact with him. He had recently been promoted captain, when he was taken by the illness which proved fatal.

A life-long friend writes: "Arthur Chavasse was one of those men whom to know was to love. He was a wonderful personality, so full of energy and enthusiasm. He was a devout Churchman and spent his leisure hours, when at St. Thomas's Hospital, in the slums of the East-End. He had an absolute horror of ostentation or publicity. Now we know a little of his endless acts of kindness and of his true generosity." Lady Chavasse has received a message of regret and sympathy from the King and Queen.

DOUGLAS ARTHUR CAMPBELL LAYMAN,

LIEUTENANT, 17TH LANCASHIRE FUSILIERS.

Second Lieutenant D. A. C. Layman, who was killed in France on Feb. 22nd, at the age of 22, was a medical student and the grandson of a medical man. He was educated at Dulwich College, where he was a member of the Officers Training Corps, entering St. Thomas's Hospital in 1913, and taking part of the Second M.B. in July, 1914. The secretary of the hospital writes: "From the first declaration of war Layman was anxious to do his best to help. He made a special appeal for experience in dressing in the Casualty Department, and in October, 1914, went to help with Red Cross work in France. He subsequently did nine months excellent work on the I.M.S. Hospital Ship, *Glengorm Castle*. Even this work did not content him, he wanted to do more, and by obtaining a commission in the Lancashire Fusiliers in September, 1915, and going to the front, he sacrificed everything to his ideal of duty."

THE RED CROSS HOSPITAL UNIT IN MONTENEGRO.—In a recent summary of work issued by the British Red Cross Society and the Order of the Hospital of St. John of Jerusalem in England there is an interesting report, signed by Dr. F. G. Clemow, C.M.G., head of the unit, on the work of the Red Cross Hospital in Montenegro. The unit left England on Jan. 19th, 1915, with three medical men—Dr. Clemow, head of the mission, and Dr. F. W. E. Burnham and Dr. L. V. Tebbs, who subsequently had charge of the general section and infectious wards respectively. The other members of the staff were two nurses, two V.A.D. attendants, and four orderlies. The equipment consisted of material for a hospital of from 70 to 100 beds, the stores being contained in some 400 cases and bales. After considerable delay, owing to weather and war conditions, the unit arrived at Plevlje in March, and took over charge of the hospital there—the principal military hospital in Montenegro. The hospital consisted of two separate sections, one of eight pavilions built by the Austrians, as barracks, during their military occupation, and a hospital building. The first-named buildings were reserved for general and medical cases, and the second for infectious cases. At the time of occupation there were 126 patients in the wards, but the number rapidly doubled, and later rose to more than 300. For a short period Dr. Peyer, a Swiss doctor, and Dr. Vullanovitch and Dr. Krasky, both of the Montenegro service, rendered assistance. Owing to bad sanitation and administration the buildings when taken over were far from ideal for hospital purposes. To increase the accommodation other buildings were taken over, and a vote of £1000 from the British Red Cross Society resulted in the construction of satisfactory hospital buildings. There were a few cases of typhus fever in the wards when the hospital was taken over, and these rapidly increased in number, while to add to the difficulties of the staff first Dr. Tebbs and afterwards Dr. Peyer contracted the disease, and one of the orderlies fell ill and died. At the end of March Dr. Clemow, at the instance of General Vukotitch, drew up a series of army orders for the better preservation of the health of the Serbian troops, and in June took part in a conference at Cettinje on the medical needs of the hospital, the army, and the country generally. The King of Serbia, who subsequently conferred decorations and medals on various members of the unit, received Dr. Clemow and expressed appreciation of the work of the unit. In July, on the expiry of the original six months' contract, Dr. Tebbs and other members of the unit returned home, Dr. W. E. Haigh replacing Dr. Tebbs, and others taking the place of the original staff which maintained its complement of 11 members. Until the month of September the majority of cases admitted to the hospital were of the ordinary medical and surgical character. The measures taken to meet the typhus epidemic of the spring, which steadily subsided, included the establishment of baths and of two disinfecting stations, one in the general and the other in the infectious section of the hospital. Every patient admitted had his clothes removed, was bathed and put to bed, and the clothes thoroughly disinfected either with sulphur or (later on) with formaldehyde. In all 143 cases of typhus were admitted, of which 7 died and 136 recovered. In the surgical wards over 500 major operations were performed and Dr. Burnham gained a well-deserved reputation as a surgeon. At the end of September and beginning of October, in order to provide for the large number of wounded, the result of the combined Bulgarian and Austro-German attack, many cases of chronic or incurable illness were sent to their homes. A casino and concert hall were converted into a hospital which was soon filled, while many of the severely wounded had to be placed in the "infectious" section and of the lightly wounded in the "convalescent hospital." The total numbers rose to well over 300, and at this time, as well as during the typhus epidemic in the spring, the stress of work on all members of the unit was very considerable. In all between 300 and 400 wounded were in the hospital at the final evacuation. The total number of in-patients treated in the hospital was approximately 3000 and that of the out-patients the same. About the middle of November, owing to the pressure of the Austrians, it was found necessary to remove the hospital from Plevlje to Shahovitza. At this time there were 332 patients in the wards, of whom 223 were wounded. In three days 280 patients were sent either to Shahovitza or to their homes, and

when the unit left, which was on Nov. 21st, only 50 patients remained behind. These were left in charge of Dr. Stais, a Greek doctor, and Dr. Kievenaar, a Dutch medical man, who followed the unit next day with the patients. The patients' journey and the adventures of the unit are briefly described by Dr. Clemow, and but little imagination is required to realise the hardships which the party had to endure or to picture their lucky escapes from disaster. In December all the stores were exhausted and the party left Serbia and arrived in England in January, 1916. In closing his report Dr. Clemow bears testimony to the excellent work of all the members of the unit, the best witness to the valuable work of Dr. Tebbs being the low typhus mortality, while equally valuable work was done by Dr. Haigh, and his untiring assistance to all during the retreat deserves, says Dr. Clemow, more than a passing word. Dr. Burnham's work in the surgical wards has already been alluded to.

HEALTH OF MUNITION WORKERS.—The munition workers of this country are fortunate in possessing a health committee which is both alert and enlightened. We have already noticed memorandums dealing with Sunday labour, canteens, the hours of work, and the employment of women. Four others have just appeared in which are considered industrial fatigue and its causes (No. 7), special industrial disease (No. 8), ventilation and lighting of munition factories and workshops (No. 9), sickness and injury (No. 10). All of these are printed at H.M. Stationery Office and may be obtained from Wyman and Sons at the cost of 1*d.* or 1½*d.* To the medical bearing of these pamphlets we shall return later.

PROPHYLAXIS OF VENEREAL DISEASE.—In recent years attempts have been made in all armies and navies to prevent venereal disease by methods of what may be called subsequent prophylaxis. Men after exposure to infection are invited, and indeed constrained, to attend for special washings and anointings which shall prevent the development of any virus they may have picked up. And very often it has been said, by medical officers of small units usually, that the results of these methods have been quite successful. But now, in the *Military Surgeon* (Washington, D.C.) for January, Surgeon (that is, Fleet-Surgeon) R. C. Holcomb, U.S.N, examines the medical statistics of the United States Navy during the six years that have elapsed since, in January, 1909, prophylaxis was commenced, and concludes that "there has since been no drop in the admission-rate, and that therefore the preventive has not prevented." He then asks why the propaganda has failed, and ascribes it to the subsequent prophylaxis being in most cases too long delayed. He himself found, on critically examining records of some 3000 cases, that of those who took precaution within eight hours of exposure only 1·5 developed disease. If precautions were taken between the eighth and the twelfth hour 3·3 per cent. were attacked, but of those who delayed treatment to the second 12 hours 5 per cent. suffered. The experience of the Italian navy is very similar. Venereal prophylaxis, with calomel ointment and protargol, was instituted in October, 1913, and Captain Dr. Serra, a surgeon in that navy, details in the *Annali di Medicina Navale* for October, the benefits this prophylaxis has brought to the group of 2600 men who are under his care at Spezia. He concludes that the men who on their return from leave use the prophylactics supplied invariably escape syphilis. The annual report of the Surgeon-General of the United States Navy for 1915 also takes much the same view, ascribing failure to delay, this delay resulting from ignorance, intoxication, or indifference. Surgeon Holcomb thinks the best prophylaxis will be found to be moral and to lie in a better public opinion, a higher self-control.

CHARING CROSS HOSPITAL.—The annual court was held on March 23rd, Mr. George Verity, J.P., presiding, when a very satisfactory condition of affairs was reported. The chairman stated that the hospital was now working at its full capacity of 300 beds, and he was able to report a great improvement in equipment. The hospital mortgage, which 15 years ago was £85,000, had been reduced to £59,000, and any legacies or exceptional amounts received by the hospital were applied towards the liquidation of this capital debt. The officials of the King's Hospital Fund stated that the cost per bed at this hospital was the lowest but one of any in the Metropolitan area. Dr. G. Dickinson's 17 months' gratuitous service as resident medical officer in order to meet the shortage due to the war demands was specially mentioned.

Obituary.

MARY CHARLOTTE MURDOCH, L.R.C.P., L.R.C.S.EDIN., L.F.P.S. GLASG.,

SENIOR PHYSICIAN TO THE VICTORIA HOSPITAL FOR CHILDREN, HULL.

THE death occurred on March 20th of Miss Mary Charlotte Murdoch, senior physician to the Victoria Hospital for Sick Children, Hull.

Mary Charlotte Murdoch was born in Elgin and spent part of her child life and educational period in Lausanne, as well as in London. When the death of her parents left her independent she decided to devote the small sum of money at her disposal to studying for the medical profession, although this resolve meant much self-denial, and in her case considerable courage, as she had to contend already with the gastric hæmorrhages which throughout her life occasionally prostrated her. After obtaining qualifications from the Scottish Corporations, she worked for a time as clinical assistant at the New Hospital for Women in the Euston-road, and was later curator of the museum of the London School of Medicine for Women. In 1892 she became house surgeon to the Victoria Hospital for Children at Hull, a post which she held for two years, when an attack of gastric hæmorrhage compelled her to resign. Upon recovery she was appointed assistant medical officer for the Tottenham Fever Hospital, London, under Dr. R. A. Birdwood, to whose instruction and clinical example she attributed the skill which she undoubtedly possessed in the diagnosis and treatment of acute infectious diseases. In 1894 she returned to Hull, where she had made many friends, and, starting in private practice, met with immediate success. She was appointed honorary assistant physician to the Victoria Hospital, where she had formerly been resident, and three years later became full physician, holding the post at the time of her death. Among other appointments she was physician to the Lees' Walk Home for Girls and to the Hull Central Crêche, and was a certifying surgeon under the Factory Acts. She was also consulting physician to the Harrow Road Hospital for Children in London, and was keenly interested in the suffrage question.

Mary Charlotte Murdoch was more than a successful physician: she was an influential personality. She did much valuable public work when physically not equal to the strain, she was a woman of large sympathies, and invariably acted up to her high ideals, and there is no doubt that in her the medical profession and women workers have lost an outstanding force for good.

GEORGE ALFRED HEBERDEN, M.R.C.S., L.R.C.P., D.S.O.

THE death is announced from Sea Point, South Africa, of George Alfred Heberden, which occurred from heart trouble in January last, in his fifty-sixth year. He had been an invalid for some time, and recently left his home at Victoria West, South Africa, for the Cape, where he somewhat improved. At the beginning of the year, however, he had a relapse, which soon proved fatal. George Heberden bore a name well known in medicine, his great-grandfather being the famous William Heberden, of Heberden's asthma and Heberden's nodes. His grandfather was also a medical man, while his father was a Berkshire clergyman. George Heberden was educated at Jesus College, Cambridge, and later, determining on the medical profession, he entered as a student at St. George's Hospital. He took the Conjoint English qualification in 1888, and almost immediately went to South Africa and entered upon practice at Kenhardt. Afterwards he became district surgeon to Barkly West, where he was when the South African War broke out. His services as medical officer at the siege of Kimberley were of marked value, and for them he received the D.S.O. Subsequently in 1906 he became district surgeon and railway medical officer at Victoria West, which offices he held at the date of his death.

PROFESSOR EUGENI PAVLOV.—A Russian correspondent writing to us from Moscow informs us that the news of the death of Professor Ivan Petrovitch Pavlov, director of the Physiological Section of the Institute for Experimental Medicine at Petrograd, was sent in error. The Professor Pavlov who died in February last was not the famous physiologist, but Professor Eugeni Vasilievich Pavlov, once a prominent Russian surgeon and well known in his own country for his excellent social work. Professor Eugeni Pavlov was 71 years of age.

Medical News.

SOCIETY OF APOTHECARIES OF LONDON.—At examinations held recently the following candidates were successful:—

Surgery.—M. Dwyer (Sections I. and II.), Leeds; J. Fox-Russell (Sections I. and II.), Middlesex Hospital; H. M. Gray (Sections I. and II.), Guy's Hospital; and R. Milne (Sections I. and II.), London Hospital.

Medicine.—M. Dwyer (Section I.), Leeds; E. N. Glover, (Sections I. and II.), Guy's Hospital; and R. Milne (Sections I. and II.), London Hospital.

Forensic Medicine.—C. G. Bunn, Charing Cross Hospital; M. Dwyer, Leeds; E. N. Glover, Guy's Hospital; R. Milne, London Hospital; R. H. Pettersson, St. George's Hospital; and J. M. Wall, St. Thomas's Hospital.

Midwifery.—R. Milne, London Hospital; L. F. Pain, Royal Free Hospital; and A. E. Pollitt, Manchester.

The Diploma of the Society was granted to the following candidates, entitling them to practise medicine, surgery, and midwifery:—J. Fox-Russell, H. M. Gray, and R. Milne.

UNIVERSITY OF DURHAM: FACULTY OF MEDICINE.—At the third examination for the degree of Bachelor of Medicine held recently the following candidates were successful:—

Materia Medica, Pharmacology and Pharmacy, Public Health, Medical Jurisprudence, Pathology and Elementary Bacteriology.—Percy Vernon Anderson, Richard Vere Brew, Hugh John Dingle, Donald Henegan, William Andrew Hewitson, Charles Gordon Irwin, George Malayramon Kerry, John Kerr Ritchie Landells, Sadek Abdel Shehid, Iskander Soliman, and Harold Ivan Sterne-Howitt.

CENTRAL MIDWIVES BOARD.—A meeting of the Central Midwives Board was held at Caxton House, Westminster, on March 16th, with Sir Francis H. Champneys in the chair. The Board had already considered a large number of suggestions for the amendment of the rules sent in by local supervising authorities, medical officers of health, examiners, and others; and, the revision being now completed, have decided to ask the Privy Council to approve the revision and to order that the new rules shall come into force on July 1st next, for a period of five years. A letter was considered from the General Medical Council with regard to an apparent case of "covering" an uncertified woman by a registered medical practitioner. The Board directed that the papers in the case be forwarded to the General Medical Council with a request that they will take such action in the matter as may seem fit to them, and that if so desired the Board will undertake to appear as prosecutors in the case. Letters were considered from the clerks to the Epsom and Chester boards of guardians asking that the Epsom Infirmary and the Chester Union Hospital may be treated as training schools, where a period of four months' training may be substituted for one of six months as provided for in the new rules. The Board directed that the clerks be informed that the Board has no power to grant the requests. A letter was considered from the medical officer of health of Liverpool asking whether under the new rule the conceded four months' period of training may be taken during the stipulated three years' training and may form part of such training. The Board decided that there is nothing in the rules to prevent the four months' midwifery training contemplated by the rule being taken during the three years' general training and forming a part of it.

LIVERPOOL MEDICAL INSTITUTION: JUBILEE OF MR. EDGAR A. BROWNE AND DR. GEORGE C. WALKER.—Fifty years' membership of the Liverpool Medical Institution is a notable record, and it is one on which the cordial congratulations of a large number of fellow members and professional colleagues were paid recently at a special meeting of the society, to Mr. Edgar Athelstane Browne, consulting surgeon to the Liverpool Eye and Ear Infirmary, and Dr. George Charles Walker, of Southport. The Lord Mayor was unfortunately prevented from attending the ceremony in order to tender the good wishes of the city to the two medical veterans. Dr. C. J. Macalister, the president of the institution, occupied the chair, and tendered a graceful tribute to the work and personality of both members, whose association with the society dated from the year 1866. Professor T. R. Glynn spoke of the ready wit and lively imagination of Mr. Edgar Browne, inherited from his distinguished father Hablot Browne. Dr. Richard Caton and Mr. T. H. Bickerton having both borne testimony to the personal qualities of the two members, a resolution setting forth their professional history, together with an expression of the kindly sentiments of their brethren on their interesting jubilee, was cordially adopted.

DONATIONS AND BEQUESTS.—The late Colonel H. L. Florence, V.D., has, among other bequests, left £10,000 each to St. Bartholomew's Hospital and Charing Cross Hospital. The residue of the estate, subject to two life-interests, amounting to about £100,000, is to be divided equally between St. Bartholomew's Hospital, Charing Cross Hospital, the National Gallery, and a number of other hospitals and museums.

THE MEDICAL PROFESSION AND MASSAGE ESTABLISHMENTS.—Under the provisions of the London County Council (General Powers Act), 1915 (Part V.), an establishment for massage or special treatment is defined as meaning any premises in the County of London used or represented as being or intended to be used for the reception or treatment of persons requiring massage, manicure, chiropody, light, electric, vapour, or other baths, or other similar treatment, and persons carrying on such establishments must be registered. Medical men are exempted, but they must comply with certain requirements in order to escape registration. These requirements have been the subject of discussion by the Council of the Metropolitan Counties Branch of the British Medical Association, and at a meeting held on March 14th resolutions were adopted to the following effect: (1) "That it is derogatory to the medical profession that a medical practitioner shall be required to furnish two certificates showing that the establishment for which he is responsible 'is not and will not be used for an immoral purpose'"; and (2) "that the terms of the Act in relation to medical practitioners are so widely drawn that no medical practitioner is wholly safe from certification or from inspection under the Act."

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

Reports of Medical Officers of Health.

IN the annual report of the Local Government Board for 1914–15 relating to Housing and Town Planning there is a reference to the reports of medical officers of health in the section devoted to housing conditions. The report states that upon the whole there has been a considerable improvement in the reports in the last few years, and there is fresh evidence that the increased interest in the matter taken by medical officers of health and inspectors of nuisances has a material influence for good in the consideration of the subject by the local authorities. There are, however, still cases in which the Board is unable to regard the reports as sufficient and has to ask for a supplementary report containing further and fuller information, but the number of such cases shows a decided tendency to diminish.

Financial Statement of the General Medical Council.

The annual return has been presented to Parliament of the receipts and expenditure of the General Medical Council and the Branch Councils.

An Extraordinary Incident.

The House of Commons on Wednesday afternoon was startled by an extraordinary incident. While a new Member was taking the oath at the table an officer in military uniform who had been sitting in the Strangers' Gallery climbed over into the Distinguished Strangers' Gallery. He scrambled over the rail and for a few moments hung to it by his hands. He then dropped some 20 feet or more on to the floor of the House. Falling heavily, he rose, and evidently addressing the Speaker, said: "Sir, I ask you to protect the heads of British soldiers from shrapnel fire." Members were amazed at the incident and at the rapidity with which it occurred. The officer was speedily conducted from the House. It was afterwards reported at Westminster that the was an officer in the Royal Army Medical Corps.

HOUSE OF COMMONS.

WEDNESDAY, MARCH 22ND.

Military Isolation Hospitals at Cambridge.

Mr. PAGET asked the Under Secretary for War whether his attention had been called to a resolution passed by the town council of the borough of Cambridge on Thursday, March 2nd, 1916, drawing the attention of the War Office to

the lack of control of, and to the insufficient guards placed at, the military isolation hospitals in Cherryhinton-road and Newmarket-road, whereby patients were enabled to escape and thereby cause danger to the health of the community; and would he say what steps he proposed to take in the matter.—Mr. TENNANT answered: This matter is already under the consideration of the Army Council. I cannot state to-day what steps it is proposed to take in the matter.

Tuberculous Soldiers and National Insurance.

Replying to Major ASTOR, Mr. C. ROBERTS (representing the National Insurance Commissioners) said: Approximately 2000 cases of tuberculous soldiers have passed through the hands of the several commissions in connexion with the arrangements made in April, 1915, for the provision of immediate residential treatment for discharged tuberculous soldiers and have been provided with treatment. In addition it is known that a large number of soldiers who became on or after discharge eligible for sanatorium benefit, have made application for the benefit direct to the local Insurance Committees, who have afforded treatment without reference to the Insurance Commissioners. The actual number of such cases, including, of course, many cases which arose before the special arrangements were established, could not be obtained without a special return from all Insurance Committees in the United Kingdom.

A College of Nursing.

Mr. HOGGE asked the President of the Board of Trade whether he had been asked to incorporate a college of nursing; whether he had received protests from societies of trained nurses, in particular the Scottish Society; and whether, in view of the Bill before Parliament prior to the war dealing with trained nurses, he proposed to do so.—Mr. RUNCIMAN replied: I have received certain protests against the grant of a licence to enable a college of nursing to be incorporated with limited liability without the addition of the word "Limited" to its name, including one from the Scottish Society of Trained Nurses. I have not yet received any application for such a licence.

Mr. HOGGE: If my right honourable friend receives an application will he bear in mind that there was a Bill before Parliament on the subject, and will he remember that fact in giving his decision?—Mr. RUNCIMAN: Yes, sir.

Pensions for Army Nurses.

Speaking during the debate on the motion for the second reading of the Consolidated Fund (No. 2) Bill, Mr. H. FORSTER (Financial Secretary to the War Office) said that at the outbreak of the war there was a system of pensions and disablement allowances for the army nursing staff. There were various qualifications as to length of service and so on. These were wholly inapplicable to present conditions. The War Office had taken steps to institute a special scale of pensions for those nurses who were disabled either by diseases, accident, or anything of the kind wholly and directly due to service or aggravated by service, and he hoped that the scale of pensions which had been framed would be sufficiently generous to meet the case. The matter had been discussed with the head of the nursing service, the matron-in-chief.

THURSDAY, MARCH 23RD.

Medical Arrangements in Mesopotamia.

Answering Mr. FELL, Mr. TENNANT (Under Secretary for War) said: Medical arrangements in Mesopotamia are primarily under the control of the military authorities in India, but the Commander-in-Chief in India has been informed that the Army Council would render him any assistance in medical personnel and equipment. All demands have been met without delay. 120 medical officers (including 40 from Egypt) and 205 other ranks, R.A.M.C., have arrived or are on their way. In addition, one British general hospital of 1040 beds and one British stationary hospital of 400 beds have been sent from Egypt. Both these units were fully equipped. Four Indian general hospitals of 500 beds each, which were in this country, have also been sent. Two of these were fully equipped and the remaining two consisted of personnel only. From France the Lahore Indian stationary hospital of 200 beds and 33 medical officers are under orders. A motor ambulance convoy—50 cars with complete personnel—is nearly ready and will leave for Mesopotamia early next month.

Colonel LOCKWOOD: Have any of them arrived?—Mr. TENNANT: I have not had any intimation to that effect.

Mr. MALCOLM asked the right honourable gentleman since what dates all military and medical questions connected with the British expedition to Mesopotamia had been taken over by the War Office.—Mr. TENNANT answered: The new arrangements for the control of operations in Mesopotamia came into force from Feb. 16th, 1916. The Commander-in-Chief in India receives instructions from the Chief of the Imperial General Staff in exactly the same manner as the commanders-in-chief in other theatres, but India remains the main base of the forces in Mesopotamia which is administered by the Commander-in-Chief in India. Such requirements of the force as India cannot meet are supplied by the War Office from other parts of the Empire so far as considerations of general policy do not render this impracticable.

Mr. MALCOLM asked whether Sir William Vincent and General Bingley had proceeded to Mesopotamia to conduct the inquiry into the alleged breakdown of medical arrangements.—Mr. TENNANT said in reply: The Commission, after taking evidence in Bombay, left for Mesopotamia on March 10th. Sir William Vincent is a man of wide administrative experience and has proved efficient in high and responsible official posts, and Major-General Bingley has had a great deal of staff experience and is well suited for an inquiry into the alleged deficiencies in the organisation of supplies. I think these gentlemen are amply qualified to elucidate the facts and to make a fair, complete, and judicial report upon them, having reference to all aspects of the question. They can procure any technical and expert evidence they desire.

Lord HENRY CAVENDISH-BENTINCK asked the Secretary for India whether up to five weeks ago repeated offers made by several hospital supply depôts to send out large quantities of hospital supplies to Mesopotamia were refused; and if so, would he say by whom these offers were refused, and whether he would cause an inquiry to be made into the cause of the breakdown of the hospital arrangements in Mesopotamia.—Mr. CHAMBERLAIN (in a written answer) replied: I have been informed since this question appeared on the paper that the Joint War Committee of the British Red Cross Society and the Order of St. John of Jerusalem in coöperation with the Indian Soldiers' Fund offered their general assistance direct to the general officer commanding Mesopotamia in July last, and repeated their offers at later dates; that stores were sent by them to Basra in September, two motor loads in August and another in October. In December I transmitted further offers on their behalf. On Jan. 31st last the following offer was made officially by the committee to the India Office. They offered to place at my disposal the organisation of the two societies to supplement the provision made by the Indian Government for the care of sick and wounded in Mesopotamia. The offer was in the widest and most generous terms, but referred in particular to the possibility of help in the supply of stores, of clothing, medical comforts, drugs, and luxuries not included in the scheduled army lists, in the supply of barges, motor ambulances, and other vehicles for the transport of the sick and wounded, and in the equipment of hospitals and in providing personnel to staff and administer such hospitals. I immediately communicated this generous offer to the Viceroy. Before replying he had to ascertain that it would not conflict with the organisation and arrangements of similar Indian societies, but on Feb. 19th he informed me that the Indian Council of St. John Ambulance, which from the outset had actively concerned itself with the Mesopotamia Force, would gladly accept the assistance. I communicated the Viceroy's reply the same day to the Joint War Committee. As regards other societies, the Indian Soldiers' Fund in October made inquiry through me of the military authorities in Mesopotamia as to whether clothing and comforts were needed for the troops, and was informed by them in reply that for the present the supply from India was sufficient. I understand that the Fund Committee at that time had independent evidence that there were sufficient supplies at the base. In December I received from the fund and transmitted to the Viceroy an offer to supply bandages, surgical dressings, and other medical and hospital comforts. The Viceroy gladly accepted it and early in January a large contribution of articles, some of which were contributed by the Joint War Committee, was despatched to Mesopotamia. Besides the offers which were made through me and those made independently of me, to which I have already referred, many offers of which I have no knowledge may have been made direct to corresponding societies in India which were engaged in providing comforts for the combatants and medical supplies for the hospitals. I understand that the Indian Branch of St. John Ambulance has from the first taken a very active part in providing for the medical needs of the force. With regard to the last part of the question, I would refer my noble friend to the statement which I made yesterday.

The Organisation of the R.A.M.C.

Sir PHILIP MAGNUS asked the Under Secretary for War whether any and, if so, what steps had been taken to arrange that doctors with special experience in different branches of medicine and surgery who had joined the Royal Army Medical Corps were being so employed by the War Office as to utilise to the best advantage their special qualifications.—Mr. TENNANT answered: I can assure the honourable gentleman that every effort is made to employ gentlemen who join the Royal Army Medical Corps in such a way as to give their individual qualifications every consideration. But I must at the same time point out that it is sometimes not practicable to use their services exclusively in one special line of practice, as the need for special work is limited. My

information is that these gentlemen willingly give their attention to work outside their special qualifications when work of that kind is awaiting attention.

Sir PHILIP MAGNUS asked whether the Government would consider the advisability of reconstituting the Advisory Board to coöperate with the general superintendent in the further organisation of the medical service; and, if so, whether he would have regard to the suggestion that had been made by a number of medical men that such a board should consist of some lay representatives.—Mr. TENNANT replied: I take note of the honourable Member's suggestion, but I cannot admit that a case has been made out for interfering with the organisation as it at present exists.

Mr. R. MCNEILL: Is it not a fact that the Advisory Board was, in point of fact, in existence when the war broke out and that neglect to call it together was without any proper authority whatever?—Mr. TENNANT: No, sir, I think my honourable friend is misinformed as to the facts. I did give him a description of what occurred at the beginning of the war in the debate the other evening. It was quite within the competence of the military authorities to suspend the activities of the Advisory Board as and when they might think proper, but I think it is true that the Board had been sitting up to that time.

Sir PHILIP MAGNUS asked whether the right honourable gentleman could see his way to utilise to a greater extent the services, in part-time work at hospitals or in looking after the health of troops, of medical practitioners resident in the neighbourhood, and by so doing to release a proportion of the men who had volunteered for whole-time service abroad or had been asked to take commissions in the Royal Army Medical Corps.—Mr. TENNANT wrote in reply: The policy suggested in the question is already followed. There is now a considerable number of medical practitioners employed in part-time work, and it is anticipated that this number will be largely increased.

Venereal Disease.

Colonel LOCKWOOD asked the Prime Minister whether it was the intention of the Government to adopt the Report of Lord Sydenham's Commission on Venereal Diseases; and, considering that history showed a recrudescence of such disease at the end of every great war, whether he would take steps to put into immediate action the recommendations of this Commission.—Mr. LLOYD GEORGE (on behalf of Mr. ASQUITH) replied: The recommendations of the Royal Commission are now under consideration.

Steel Helmets for the Troops.

Answering Sir D. GODDARD and Sir I. HERBERT, Mr. LLOYD GEORGE (Minister of Munitions) said that reports of a very satisfactory nature had been received on the steel helmets for the troops, and the necessary steps had been taken to obtain a supply sufficient to meet the requirements of the War Office. More than 300,000 had already been delivered. A satisfactory pattern was approved some five months ago and changes were being made to meet the improvements suggested by experience.

TUESDAY, MARCH 28TH.

Medical Arrangements in Mesopotamia.

Mr. R. GWYNNE asked the Under Secretary for War whether, when the shortage of doctors and nurses and hospital equipment for the forces in Mesopotamia was realised by the Government, any endeavour was made to transfer some of the hospital equipment in Egypt, and at present not being used, and so to secure aid to those wounded who were dying for want of attention.—Mr. TENNANT answered: Yes, sir. Aid was offered as soon as it was realised that aid was wanted.

Mr. GWYNNE asked the Secretary for India whether offers of hospital supplies for Mesopotamia were made by hospital supply depôts three months ago to the proper authorities, which offers were renewed from time to time, but were refused on the plea of sufficiency and that India had more than enough for all eventualities.—Mr. CHAMBERLAIN wrote in reply: The Government of India are responsible for the equipment of all forces coming from India, the War Office for those coming from Europe. Supply is arranged by the Government of India in communication with the India Office or the War Office, according to the nature of the supply.

Venereal Disease in Army in Egypt.

Colonel LOCKWOOD asked the Under Secretary for War to state how the recent figures given regarding admission ratio per 1000 for venereal disease in Egypt compare with the years 1913, 1914, and 1915.—Mr. TENNANT replied: The annual admission ratio per 1000 of strength for the years mentioned was: 1912, 110·8; 1913, 117·7; 1914 (first eight months), 140 4. I gave my honourable and gallant friend the figure 46·8 per 1000 for the eight weeks ending March 20th, 1916. The figures for 1915 are not available.

Payments for Examining Recruits.

On the third reading of the Consolidated Fund (No. 3) Bill, Mr. RENDALL called attention to the remuneration paid to medical men for examining recruits. During the time of the Derby campaign some medical men worked 16 hours a day and dealt with as many as 200 or 300 recruits a day. It was unfair that the rate of remuneration should have been only £2 a day, the same as was paid to medical men who only worked for six hours and examined 40 recruits.—Mr. H. FORSTER (Financial Secretary to the War Office) said that the instructions issued by the War Office as to the amount of work that should be done in a day were directed to get some real kind of medical examination. The medical authorities at the War Office were consulted as to the number of men who might reasonably be examined with some searching care in the course of six hours. The reply of the medical authorities was that a medical man might be properly expected to examine something like 40 men. The War Office did not want excessive numbers to be examined at a time. It became clear when the great rush of recruits came that a medical examination on the latter lines was so rushed as to be imperfect and worthless. Such hurried examinations had to be done over again. In the last days of the Derby rush there was no question of losing recruits. The men having been registered could subsequently be called up for medical examination.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

BAKER, MADELEINE STUART, M.D., B.Ch., B.A.O. Dub., has been appointed Deputy Acting School Medical Officer for the Bristol Education Committee.

LAM, PING WING, M.B., Ch.B. Edin., has been appointed Resident Medical Officer to the Leicester Board of Guardians.

PEACHELL, GEORGE ERNEST, M D., B.S Lond., L.R C.P., M.R C.S., has been appointed Medical Superintendent at the Dorset County Asylum.

ROBERTS, H. S. W., L.R.C.P. & S. Edin., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Ballindalloch District of the county of Banff.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BELGRAVE HOSPITAL FOR CHILDREN, Clapham-road, S.W.—Resident Medical Officer for six months. Salary at rate of £100 per annum, with board, residence, and washing.

BIRMINGHAM AND MIDLAND EYE HOSPITAL, Church-street.—Resident Surgeon.

BOLTON INFIRMARY AND DISPENSARY.—Female Second House Surgeon and Female Third House Surgeon. Salary £200 and £180 per annum respectively, with apartments, board, and attendance.

BRISTOL GENERAL HOSPITAL.—Casualty House Surgeon. Also House Physician. Both for six or three months. Salary at rate of £175 per annum each, with board, residence, &c.

BRISTOL ROYAL INFIRMARY.—House Physicians and House Surgeons. Salary at rate of £120 per annum, with board, apartments, and laundry.

BURNLEY, VICTORIA HOSPITAL.—Female House Surgeon. Salary £160 per annum, with residence, board, and washing.

CHARING CROSS HOSPITAL.—Resident Medical Officer.

CHESTERFIELD AND NORTH DERBYSHIRE HOSPITAL.—Second House Surgeon. Salary £150 per annum, with board, apartments, and laundry.

DORSET COUNTY COUNCIL.—Temporary Female Assistant Medical Officer. Salary at rate of £300 per annum.

DUDLEY, GUEST HOSPITAL.—Assistant House Surgeon for six months. Salary £120 per annum, with board, residence, and washing.

DURHAM COUNTY HOSPITAL.—House Surgeon. Salary £150 per annum, with board, lodging, &c.

EAST HAM COUNTY BOROUGH EDUCATION COMMITTEE.—Temporary Female Assistant School Medical Officer. Salary £300 per annum.

EXETER, ROYAL DEVON AND EXETER HOSPITAL.—Senior House Surgeon. Salary at rate of £250 per annum, with board, apartments, and washing.

GLASGOW, ROYAL SAMARITAN HOSPITAL FOR WOMEN.—Female Muirhead Scholarship for Clinical and Pathological Research. Value £50 per annum. Also Pathologist.

GREAT NORTHERN CENTRAL HOSPITAL, Holloway-road, N.—House Physician for six months. Salary at rate of £100 per annum, with board, residence, and laundry.

GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £150 per annum, with board, residence, and laundry.

HALIFAX COUNTY BOROUGH EDUCATION COMMITTEE.—Assistant Medical Officer. Salary £350 per annum.

HUDDERSFIELD ROYAL INFIRMARY.—Junior House Surgeon. Salary £100 per annum, with board, residence, and laundry.

LONDON HOMŒOPATHIC HOSPITAL, Great Ormond-street, W.C.—House Surgeon. Also Two Resident Medical Officers. Salary at rate of £100 per annum, with board, apartments, and laundry.

LONDON TEMPERANCE HOSPITAL, Hampstead-road, N.W.—Assistant House Surgeon for six months. Salary at rate of 120 guineas per annum.

LEEDS PUBLIC DISPENSARY.—Female Resident Medical Officer. Salary £130 per annum, with board, residence, and laundry.

MANCHESTER CHILDREN'S HOSPITAL, Pendlebury, near Manchester.—Two Female Resident Medical Officers for six months. Salary at rate of £100 per annum.

NEW HOSPITAL FOR WOMEN, Euston-road, N.W.—Female Radiographer. Salary £30 per annum. Also Female Assistant Pathologist. Salary £100 per annum. Also Female Senior Clinical Assistant to Out-patient Department.

NORWICH, NORFOLK AND NORWICH HOSPITAL.—House Physician. Salary £400 per annum, with board, residence, and laundry.

PUTNEY HOSPITAL, Putney Common, S.W.—Resident Medical Officer. Salary £150 per annum, with rooms, board, and laundry.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Surgeons for six months. Salary £100 per annum, with board, residence, and washing. Also Temporary Medical Officer. Attendance once a week. £12 10s. per annum to cover travelling expenses.

ROCHESTER, ST. BARTHOLOMEW'S HOSPITAL, Kent.—Senior Resident House Surgeon. Salary at rate of £300 per annum.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Male and Female House Physicians and House Surgeons for six months. Salary £50 per annum, with board, lodging, and washing.

SALISBURY GENERAL INFIRMARY.—House Surgeon and Assistant House Surgeon. Salary £150 and £100 per annum respectively, with apartments, board, lodging, and washing.

SHEFFIELD ROYAL INFIRMARY.—House Surgeon. Salary £100 per annum, with board and residence.

SOUTHAMPTON FREE EYE HOSPITAL.—House Surgeon. Salary £100 per annum, with board, lodging, and laundry.

THROAT HOSPITAL, Golden-square W.—Honorary Medical Registrar.

WESTMORLAND CONSUMPTION SANATORIUM AND HOME, Grange-over-Sands.—Second Assistant. Salary £200 per annum, with apartments, board, and laundry.

WOUNDED ALLIES RELIEF COMMITTEE, Sardinia House, Kingsway, W.C.—Assistant Surgeon for British Hospital in France for French Wounded. Salary 5 guineas a week.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Newport, in the county of Mayo; and at East Grinstead, in the county of Sussex.

Births, Marriages, and Deaths.

BIRTHS.

BLOOD.—On March 23rd, at Brynland-avenue, Bishopston, Bristol, to Dr. and Mrs. B. N. Blood, a daughter.

HARE.—On March 22nd, at the Imperial Nursing Home, Cheltenham, the wife of Captain Theodore Hare, R.A.M.C., of a son.

LAMPLOUGH.—On March 25th, at Bredon, Alverstoke, the wife of Wharram H. Lamplough, M.D. Durh., temporary R.A.M.C., of a daughter.

MARRIAGES.

ASPLEN—O'DONNELL.—On March 15th, at St. Stephen's Church, Cheltenham, William Reginald Ward Asplen, Lieutenant, R.A.M.C., to Kate Norah, only daughter of the late Colonel A. C. O'Donnell, Indian Army, and Mrs. O'Donnell, of Maryville, Tivoli-road, Cheltenham.

OWEN—BOND.—On March 20th, at the Pro-Cathedral, Clifton, Ambrose W. Owen, M.D., B.S. Lond., late temporary Lieutenant, R.A.M.C., of Porth, Glam., to Beatrice Nina Bond, of Bridgwater, Somerset.

WAUGH—PICKERSGILL.—On March 27th, at Christ Church, Sunderland, William Grant Waugh, Captain, R.A.M.C., to Enid, only daughter of the late Charles Pickersgill and Mrs. Pickersgill, of The Elms North, Sunderland.

WHITE—MACKLIN.—On March 1st, at the British Legation, Teheran, Persia, Henry White, M.R.C.S., L.R.C.P. Lond., to Alice Martha, eldest daughter of Mr. and Mrs. Alfred Charles Macklin, of Ingleside, Wickham-road, Brockley, Kent.

DEATHS.

HARPER.—On March 24th, at Rosary-gardens, South Kensington, James Harper, M.D. Lond., Colonel, R.A.M.C. (T.), aged 58 years.

HEBBERT.—On March 19th, of relapsing fever, in Mesopotamia, Robert Francis Hebbert, Captain, I.M.S., aged 33 years.

PRICE.—On March 29th, at Hooper's Hill House, Margate, William Price, M.D., last surviving son of David Price, M.D., of Margate, aged 79 years.

N.B.—A fee of 5s. is charged for the Insertion of Notices of Births, Marriages, and Deaths.

BOOKS, ETC., RECEIVED.

ADLARD AND SON, London.
Cleft Palate and Hare-Lip. By Sir W. Arbuthnot Lane, Bart., M.S., F.R.C.S. Third edition. Price 10s.

CHURCHILL, J. AND A., London.
A Handbook of Colloid Chemistry. By Dr. Wolfgang Ostwald (Leipzig). Translated from the third German edition by Dr. Martin H. Fischer (Cincinnati), with the assistance of R. E. Vesper, Ph.D., and L. Berman, M.D. Price 12s. 6d. net.

LEWIS, H. K., London.
The Adolescent Period. By Louis Starr, M.D., LL.D. Price 4s. 6d. net.

MALOINE, A., ET FILS, 27, Rue de l'Ecole de Médecine, Paris.
La Gangrène Gazeuse et les Plaies Gangréneuses. Par les Drs. P. Moiroud et H. Vignes. Premier fascicule. Price 1.60fr.

OCEANA PRESS, Calle Chile, 525, Buenos Aires
Anatomia de los Conductos Biliares y de la Arteria Cistica. By Dr. Pedro Belou, Professor Titular de Anatomia Descriptiva de la Facultad de Ciencias Médicus de Buenos Aires.

Notes, Short Comments, and Answers to Correspondents.

THE VITAL STATISTICS OF THE LEEWARD ISLANDS.

IN his report for the year 1914–15 Mr. T. A. V. Best, the Colonial Secretary of the Leeward Islands of the West Indies (Antigua, St. Kitts-Nevis, Dominica, Montserrat, and the Virgin Islands), states that the total population of the colony, according to the last Census, was 127,193. The general health of the inhabitants during the year was good. The total number of patients admitted into the hospitals of the colony was 3713, as against 3827 in the previous year, whilst the number of deaths was only 266, as against 354. In the Leper Asylum at Antigua there were 39 lepers. The central lunatic asylum had 128 patients. The Alexandra Cottage Home for Incurables, Dominica, maintained on an average 10 paupers. In the Yaws Hospital at St. Kitts 177 patients were treated, all of whom were discharged as cured. Treatment had to be suspended and the ward closed for a time, as salvarsan, being a German preparation, was not procurable. The average rainfall from January to December, 1914, on 72 stations in Antigua was 36·86 inches, or 7·39 inches below the average of the 40 preceding years. The highest maximum temperature was 91° F. on Oct. 27th and Nov. 8th, and the lowest minimum temperature 66° on Jan. 7th. Three shocks of earthquake were recorded.

THE PUBLIC SCHOOLS YEAR BOOK.

THE twenty-seventh annual issue of this useful guide, edited by H. F. W. Deane, M.A., F.S.A., and W. A. Bulkeley Evans, M.A. (London: The Year Book Press, 31, Museum-street, W.C. Pp. 767. Price 5s. net) contains in a form handy for reference information relative to the governing bodies, staff, nomination and admission, entrance examination and scholarships, houses and dormitories, organisation and instruction, fees, charges, and prizes at the public schools, and details of the entrance examinations to the Universities. The conditions of admission to the Civil Service and other professions are included, and the sections devoted to the navy and army give the new regulations for temporary and permanent commissions. A list of preparatory schools, a public schools, bibliography, and short articles on the various professions are other useful features of the work. As the official reference book of the headmasters' conference it summarises the work of the committee of this conference. An invaluable work of reference for parents.

CHILDREN'S COUNTRY HOLIDAYS FUND.

Mr. Francis Morris, chairman of the Executive Committee, writes to say that the work of the Children's Country Holidays Fund is being carried on despite the war, and that donations are needed in order to send away the 18,000 to 20,000 children with whom it is hoped to deal this year. Efforts are being made to seek out the most ailing children in the elementary schools of London in order to provide them with a summer fortnight in country cottages. This work should appeal to all who have at heart the welfare of the growing generation.

HEALTH OF MAURITIUS.

A CORRESPONDENT writes:—In connexion with your note last week on the public health of Mauritius attention may be drawn to the meteorological observations taken at the Royal Alfred Observatory, Pamplemousses, and at nine second-order stations. The observatory is about three miles from the West Coast, and is 179 feet above sea level. There are considerable variations both in temperature and humidity in the different parts of the island, the coast districts being hotter and drier than the higher altitudes in the interior. Hurricanes occur between December and April, which is the hottest season. The mean rainfall at 49 stations was 59·10 inches as compared with 75·83 inches in 1913 and an average of 74·94 inches. Heavy rains, relatively to the normal, fell in February and June. The rainfall at the observatory was below normal, being 43·12 inches as compared with a normal of 47·95 inches, and the number of rainy days recorded was 215, as compared with an average of 204, a "rainy day" being one in which ·005 inch or more of rain was measured. The mean temperature of the air at the observatory was 73·7° F. as compared with an average of 73·4°, the highest temperature recorded being 89·9° on March 10th, and the lowest 54° on July 23rd. The highest and lowest temperatures recorded at the observatory between 1875 and 1914 were 94·7° on Dec. 23rd, 1900, and 49·9° on August 8th, 1907. From February to September the temperature remained generally above normal, falling to below normal in the last quarter of the year.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street. W.

MEETINGS OF SECTIONS.

Friday, April 7th.

LARYNGOLOGY (Hon. Secretaries—Cecil Graham, Frank Rose): at 4 P.M.
Dr. L. H. Pegler: Case of Laryngeal Tuberculosis.
Mr. E. D. D. Davis: (1) Report of a Case of Laryngeal Crises, with Abductor Paralysis (Sections of the Brain, Spinal Cord, and Vagus Nerves will be demonstrated); (2) Laryngeal Stenosis following a Bayonet Wound treated by Intubation.
Mr. Herbert Tilley: Cases illustrating Results of Intranasal Operation for Chronic Frontal Sinusitis.
Dr. James Donelan: Case of Paralysis of Left Vocal Cord in a Young Woman.
Dr. Jobson Horne: Two Cases of Suppuration in the Antrum of Highmore due to Uncommon Causes.
And other Cases.

RÖNTGEN SOCIETY, Institution of Electrical Engineers, Victoria Embankment, W.C.

TUESDAY.—8.15 P.M., General Meeting. Demonstration:—Mr. P. J. Neate:—A Chronograph constructed to Work with the Electroscope. Papers:—Mr. B. H. Morphy and Mr. S. R. Mullard: The Enclosed Tungsten Arc as a Source of Ultra Violet Light.—Mr. E. Schall: Experiments with a Coolidge Tube.—Mr. H. E. Donnithorne: A New Modification of the Ionization Method of Measuring X Rays. Exhibition of Plates showing Experiments with the Coolidge Tube in Radiography, conducted by Members of the Staff in the Radiographic Department at the Cancer Hospital.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY, West London Hospital, Hammersmith-road, W.

FRIDAY.—8 P.M., Special Clinical Evening.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.

TUESDAY AND THURSDAY—5 P.M., Lumleian Lectures:—Dr. F. E. Batten: Acute Poliomyelitis. (Lectures II. and III.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

Course of Lectures on the Anatomy of the Human Body, for First-aid and Ambulance Students (open to all members of ambulance companies and first-aid classes):—

MONDAY, WEDNESDAY, AND FRIDAY.—5.30 P.M., Prof. A. Keith. 4 P.M. to 7 P.M., Exhibition of Anatomical Preparations and Specimens in the Theatre on lecture days, and between 10 A.M. and 5 P.M. in the Hall of the Museum on the following day.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.
TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Addison: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.
THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.
FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Addison: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. E. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham); Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).
WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).
THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

THE THROAT HOSPITAL, Golden-square, W.

MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.
THURSDAY.—5.15 P.M., Clinical Lecture.

For further particulars of the above Lectures, &c., see Advertisement Pages.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, March 29th, 1916.

Date.	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Rainfall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks
Mar. 23	29·546	N.E.	...	58	38	33	32	33	Raining
,, 24	29·410	N.E.	0·01	71	44	33	33	35	Cloudy
,, 25	29·620	S.W.	...	90	45	33	37	38	Cloudy
,, 26	29·410	W.	0·05	95	49	35	35	40	Fine
,, 27	29·520	W.	0·16	83	49	35	36	39	Fine
,, 28	28·910	S.	0·87	66	43	35	40	41	Raining
,, 29	29·920	N.W.	0·23	85	45	32	32	34	Snowing

The following magazines, journals, &c., have been received:—American Journal of Surgery, American Journal of Roentgenology, Canadian Practitioner and Review, Proceedings of the Royal Society of Medicine, Pacific Medical Journal, Interstate Medical Journal, Indian Medical Record, Calcutta Medical Journal, Royal London Ophthalmic Hospital Reports, &c.

EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

MANAGER'S NOTICES.

TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and *not* to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

THE COLONIAL AND FOREIGN EDITION (printed on thin paper) is published in time to catch the weekly Friday mails to all parts of the world.

ALTERATION OF INLAND SUBSCRIPTION RATES.

OWING to the alteration in the Inland Newspaper Postal rate, the postage on each copy of THE LANCET will in future be 1*d.*, and sometimes 1½*d.*

The revised Inland Subscription rates are:—

One Year	£1 3 3
Six Months	0 13 8
Three Months	0 7 0

The rates for the Colonies and Abroad (thin paper edition) will be as usual:—

One Year	£1 5 0
Six Months	0 14 0
Three Months	0 7 0

Subscriptions (which may commence at any time) are payable in advance. Cheques and Post Office Orders (crossed "London County and Westminster Bank, Covent Garden Branch") should be made payable to the Manager, Mr. CHARLES GOOD, THE LANCET Offices, 423, Strand, London, W.C.

TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscriptions given above.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the above rates, whatever be the weight of any of the copies so supplied.

NEWSPAPERS FOR NEUTRAL COUNTRIES.

Newspapers are not at present being sent forward to neutral European countries unless posted direct from the office of publishers or newsagents who have obtained permission from the War Office for this purpose. The Publisher of THE LANCET has obtained the required permission, and he will forward copies direct from the Office to any neutral country on receipt of instructions.

ADVERTISEMENT RATES.

Books and Publications ... ...
Official and General Announcements
Trade and Miscellaneous Advertisements and Situations Vacant ... ...
Five lines and under ... ... 4*s.* 0*d.*

Every additional line, 6*d.*

Situations Wanted: First 30 words, 2*s.* 6*d.*

Per additional 8 words, 6*d.*

Quarter Page, £1 10*s.* Half a Page, £2 15*s.*

Entire Page, £5 5*s.*

Special terms for Position Pages.

Advertisements (to ensure insertion the same week) should be delivered at the Office not later than Wednesday, accompanied by a remittance.

Communications, Letters, &c., have been received from—

A.—Messrs. Allen and Hanburys, Lond.; Dr. Donald Armour, Lond.; Messrs. Arnold and Sons, Lond.; Anglo-American Pharmaceutical Co., Croydon; Messrs. Adlard and Son and West and Newman, Lond.; Agency of the University Libraries, Lond. Secretary of; Sir Clifford Allbutt, K.C.B., Cambridge; Mr. F. Coltman Allen, Stourbridge.

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